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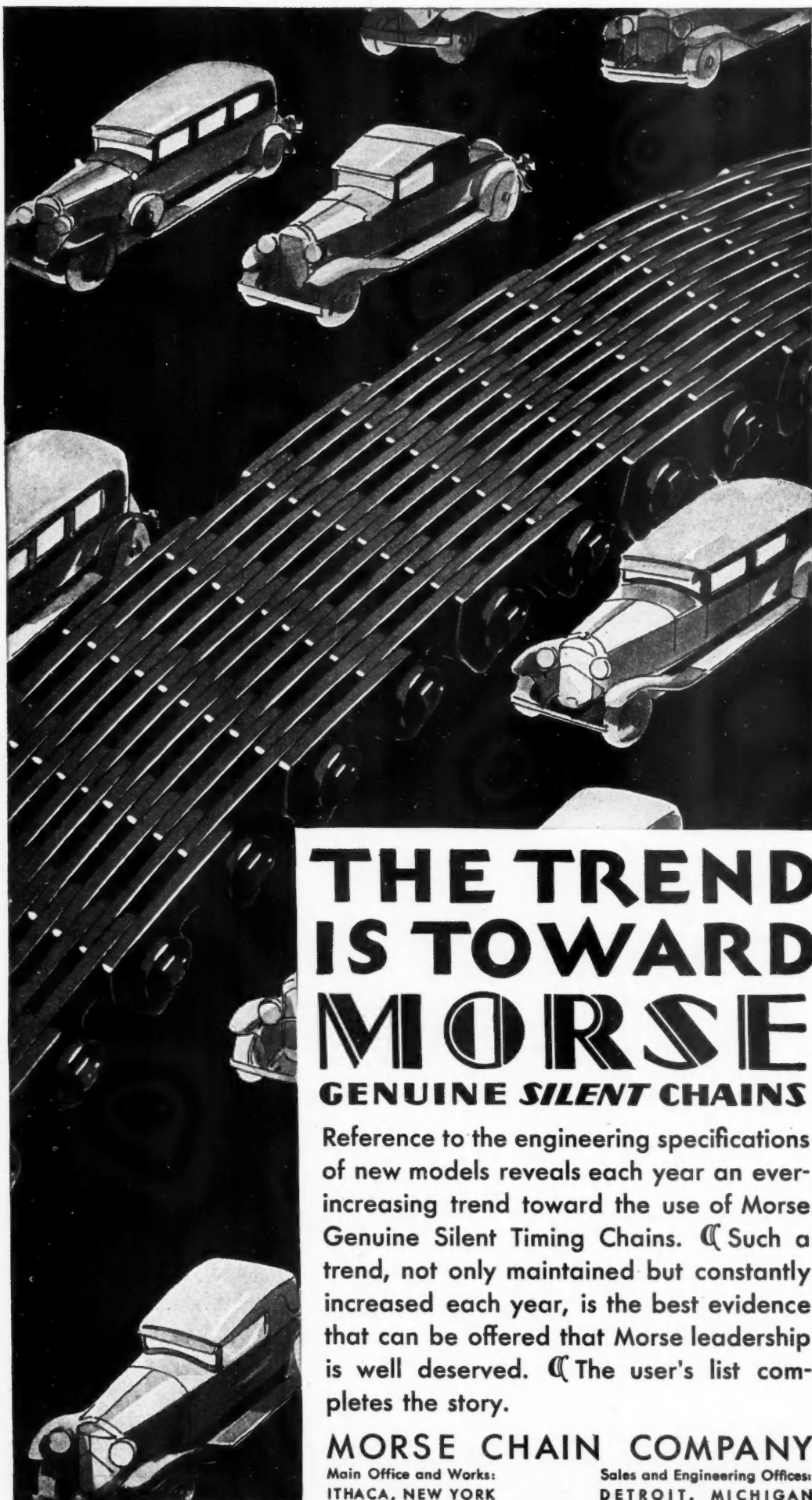


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WHO TAKES THE TRICK?

Vehicle makers find recapture of replacement parts trade involves competitive bidding against vigorous independent manufacturers

By Norman G. Shidle

CAR and truck manufacturers have begun to "get hot" about selling more replacement parts.

Facing the same sort of competition as in the past, many vehicle manufacturers seem suddenly to have become aroused from two decades of lethargy. Some of them seem to be really concerned seriously for the first time about the golden stream of replacement parts business which gradually has been diverted from their hands into the control of outside parts manufacturers, who have been willing to do the work and perform the service required by the 100,000 dealers and independent repair shops which constitute the market for these replacement units.

The declining car sales and lower net profits which thus far are characterizing 1930 vehicle manufacturing in general, undoubtedly constitute the chief reason for the sudden vigor with which a number of vehicle executives have started to pry into the replacement parts situation within the last three months. Had 1930 shown another general increase in car and truck sales it is doubtful if the current interest in improving replacement sales would have been much greater than in past years.

But the fact remains that vehicle sales haven't been good and that car and truck manufacturers in many cases are seeking definite means of recapturing some share of the replacement parts market in which they now realize they have sustained severe losses.

The most immediate reaction from this awakening of the vehicle manufacturer has been negative rather



In playing for their share of replacement business, can the vehicle maker overbid the independent and vendor manufacturer?

than positive in character. "How can we stop these independent parts makers from taking this replacement parts business which is rightfully ours?" has been the first question to arise in the minds of many vehicle executives.

Only gradually is the stage being reached where the question becomes—as it finally must—"How must we organize to get a greater share of this replacement business which inevitably will go to whatever agency provides the best product at the lowest price and makes that product most readily available to the customers who want to buy it?"

Being still pretty much in the first stage, however, it has been natural for the vehicle manufacturer to concentrate much of his immediate attention on the vendor who sells him parts for original equipment and who happens also to be selling those same parts through replacement channels other than the vehicle manufacturer.

At any rate that is what a number of vehicle manufacturers have done during the last few months, particularly in the passenger car field. Nearly every parts maker of any importance who sells for original equipment as well as through independent channels for replacement (vendor parts makers, we shall designate such manufacturers for the sake of brevity) has been called to task recently by one or more of his vehicle customers for his activities in the replacement field.

"We give you our business and yet you go right out and compete with us in the replacement field," the vendor parts maker is being told by the vehicle manufacturer. Despite the fact that conditions in this regard are just the same today as they have been for ten years or more, the objections of the vehicle manufacturers are more virulent at the moment than at any time in the past.

Positive actions to get more replacement parts business on the part of vehicle manufacturers in general have been largely limited to:

First—Making it possible for car dealers to sell parts to independent repair shops at a discount. (Generally speaking, this plan has not been successful as a means of marketing any great volume of original equipment parts. Certain manufacturers lengthened discounts on parts recently with the hope of getting more business of independents as well as a greater share of business from their own dealers.)

Second—Improving physical efficiency of parts service to own dealers.

Third—Competitive pricing of parts. Considerable revision and activity along these lines are in motion at the moment.

Fourth — Packaging and merchandising of parts. (This has really been carried forward actively in only two or three cases.)

It is the unusual vigor, however, with which the vehicle manufacturer is digging into his replacement parts situation and the unusual pressure which he is trying to put on his vendors that make this whole matter one of vital importance for current discussion. The basic facts and conditions existing today are little if any different than they have been for many years back.

The nub of the discussion centers about the trend of future policies and relations between vehicle manufacturers and vendor parts makers, the completely independent parts manufacturer being concerned only very incidentally. He can and will pursue the same vigorous merchandising effort on selling replacement parts as in the past. He would like the goodwill of the vehicle manufacturer, but that goodwill is not essential to him. He has gone his own way, efficiently and effectively, in the past and, undoubtedly, will continue to do so in the future.

Should vehicle manufacturers persist in their efforts to reduce the separate replacement merchandising activities of their vendor parts makers; should those persistent efforts be successful in the immediate future, it is altogether likely that the independent parts maker will benefit materially. He is in a position to take immediate advantage of any competition for replacement parts business which may be eliminated; the vehicle manufacturer, generally speaking, is not.

It is this important factor in the situation as it actually exists today that the vendor parts makers see very clearly and which, it would seem, is far from clear in the vision of many vehicle executives.

To envisage the long swing development in control of the replacement parts business involves the relation of a number of economic fundamentals to existing practices and policies. To perform this function in some measure will be the purpose of the following four articles in the series of which this is the first. For the moment, it may be well to complete this outline of "What's Going On," with a few indications of what seems likely actually to come out of current activities in the immediate future.

Pressure by vehicle manufacturers on vendor parts manufacturers to get out of the replacement parts business seems likely to continue. A plethora of logical arguments will continue to be opposed to this pressure; they seem likely to be continued if for no other reason than to discourage entrance of further vendor makers into the replacement field.

The actual number of vendor manufacturers who finally withdraw from the replacement parts field as a result of this pressure will, we predict, be extremely small. One or two withdrawals already have taken place, but in all such instances as have come to our attention the volume of replacement business being done through independent channels by the vendor manufacturer was negligible when compared to his total original equipment volume.

The longer vehicle executives study the practical side of the replacement parts situation, the more they will come to the belief that their success in getting a larger share of that business depends 99 per cent on the positive action which they may take in the way of merchandising, pricing, parts availability, dealer service,

etc., and about 1 per cent on any success they may have in stultifying efforts of others already in the field. Independent parts makers and vendor parts makers will continue to make further gains in percentage of replacement business until vehicle manufacturers get set up to perform for retailers equal or better service in every respect.

The currently troubled waters, then, give little indications of any radical changes in results in the immediate future. What they do portend, however, is a marked change in attitude toward the whole parts distribution problem on the part of a number of important vehicle company executives.

With the focusing of these freshened, revised mental attitudes on the economic fundamentals which
(Continued on page 762)

Independent and vendor parts makers will make further gains in replacement business until vehicle makers are able to give equal or better service to retailers

Metropolitan S.A.E. and Aeronautical Chamber of Commerce hear pilots, engineers and designers discuss the

Economic and Technical Phases of Aeronautics

By P. M. Heldt



George J. Meade, vice-president, Pratt & Whitney Aircraft Co., whose paper on the cooling of aircraft engines was a feature of the S.A.E. meeting in New York

A TWO-DAY metropolitan aeronautic meeting was held by the S.A.E. in conjunction with the Aeronautical Chamber of Commerce of America, Inc., at the Park Central Hotel, New York City, on May 6 and 7, during the week of the New York air show. Two sessions were held on each day, at each of which two papers were read and discussed. The names of a number of celebrities in the aeronautical world appeared on the program, and the attendance at the sessions was quite satisfactory, in spite of the hot weather. The meeting was closed with an aeronautic banquet sponsored by the Metropolitan Section of the S.A.E. in conjunction with the Aeronautical Chamber of Commerce of America, Inc.

A paper on "In-Line Liquid-Cooled vs. Air-Cooled Engines," by George J. Meade, vice-president of Pratt & Whitney Aircraft Co., was read by Capt. T. E. Tillinghast. It was pointed out in this paper that one of the principal advantages of air travel is speed, and there is likely to be much competition with respect to speed between transcontinental air lines. A survey recently made indicated that about 30 per cent of the available engine power is now used in overcoming resistances that can be eliminated. This means that a 500 hp. engine could give a properly designed plane the same speed as is now obtained with an 800 hp. engine, or about 20 per cent more speed than is obtained with a present-day plane with a 500 hp. engine.

In this country there already are planes with 2000 hp. engines, while the Dornier DO-X has 6000 hp. If the amount of power is to keep on increasing it would be much simpler to fit larger power units than a larger number of units of the present commercial sizes. On the Dornier DO-X no less than 12 engines are used. The powerplants should be of such size and such number that the plane can cruise with 75 per cent of its maximum power, in case of the failure of any engine.

For increased passenger comfort propeller speed must be reduced, which can be done by gearing.

The exhaust will have to be muffled and discharged well behind the passengers' quarters. Engine and propeller vibration will not be tolerated in the future, and with a larger number of cylinders per engine the vibration can be materially reduced.

Cost of operation will always be an important factor. Items of cost determined by the engine or contributed to by it are depreciation, maintenance and fuel. Fuel cost represents only about 10 per cent of the total operating cost, hence no great reduction in overall operating cost can be expected from fuel economies. At the present time the most promising method of reducing operating cost consists in building longer life into the engine and reducing its requirements with respect to maintenance.

It appears that larger powerplants will be called for in the near future, and since weight is a very important factor, whatever type of engine is chosen will have to approximate the weight standard set by the air-cooled radial. Experience up to date indicates that 600 hp. is about the maximum which can be satisfactorily applied to a single crankpin, and larger units will have to have several crankpins. However, air-cooling is ideal only for engines with all cylinders in a single plane; it is still satisfactory when the cylinders are arranged in two planes, one behind the other,

but it is doubtful whether air-cooling can be made practical with radial engines having the cylinders in more than two planes behind one another.

There are a number of examples of in-line and V-type air-cooled engines and these can be built in fairly large sizes. However, the specific weights of these types of air-cooled engines are high. Practice in this country indicates

"SPEED is of primary importance in competition between air lines, yet about 30 per cent of available engine power is used in overcoming resistance which could be eliminated" . . . George J. Meade.



"INSUFFICIENT lubrication and cooling are major difficulties in aircraft engines, but . . . every bearing of the inverted in-line air-cooled engine, including the entire valve gear, can be readily pressure or flood-oiled . . . with a simple, natural flow of oil to the valve box cover as an oil sump" . . . W. F. Davis, chief engineer, Fairchild Engine Corp.

it to be necessary to limit the number of valves per cylinder in air-cooled engines to two, as cylinder heads with more than two valves in them cannot be cooled satisfactorily. This restricts the speed of large-bore cylinders.

Today, within its power limitation, the fixed radial air-cooled engine constitutes the lightest and most dependable powerplant for commercial aviation. Future development of direct cooling probably will show the way to weight reduction with other cylinder arrangements.

Weight Handicaps Water-Cooled Plant

With comparable design and equal durability the weight per horsepower of the radial air-cooled and the V-type water-cooled engine without its cooling equipments are practically the same. The radiator and cooling water weigh about 0.6 lb. per hp., and this is a serious handicap for the water-cooled engine.

To reduce the weight of the radiator and cooling liquid required, the use of ethylene glycol has been resorted to. Engines using this cooling liquid operate at 300 deg. Fahr. instead of at 160-180 deg. With this high-boiling-point liquid the weight of the radiator and liquid is reduced to about 0.35 lb. per hp. However, with this system the oil cannot be cooled by the circulating liquid, and oil radiators must be added, which bring the weight of the equipment up to 0.4 lb. per hp., a saving of 33 per cent as compared with water cooling. It is doubtful, however, whether the same durability can be obtained with the high-boiling-point liquid unless certain parts are strengthened to withstand the higher operating temperatures. Such strengthening may cancel the weight saving due to the use of lighter cooling equipment.

Advantage of Liquid Cooling

Liquid cooling has the advantage that cylinders may be cooled almost regardless of their arrangement, and dual valves can be used. This permits of higher crankshaft speeds. But although higher speeds give greater power per unit of displacement, the weight per horsepower is not materially lessened, because the increased stresses due to higher speeds must be provided for. This makes it difficult to design a water-cooled engine to have a specific weight equivalent to that of a radial air-cooled engine, since not only radiator weight but also engine weight must be reduced.

Whether liquid-cooled in-line engines or the air-cooled type will be favored for the larger units in future cannot be foretold with certainty. Whichever type becomes the standard, its weight per horsepower will be comparable with that of the air-cooled radial engine, unless a gain in performance is secured by reducing the drag to compensate for the increased weight. Mr. Meade concluded by stating that no chances can be taken in aircraft work and that the standardization of any new type therefore may

be expected to take considerable time.

This paper was followed by considerable discussion relating to supercharging, two-stroke engines, the use of ethylene glycol, Diesel engines, etc. Glenn Angle of the LeBlond company had compiled some figures comparing the frontal areas of radial and in-line engines. One of the speakers had a good word for the Townsend ring developed in England which, he said, gives the same speed as the N.A.C.A. cowlings but leaves the engine accessible.

It was also pointed out in the discussion that ethylene glycol is combustible and might possibly add a new fire hazard, but it was stated by others who had experience with it that although a number of crashes had occurred with ships using ethylene glycol for cooling, the cooling liquid had never caught fire. A representative of the National Carbon Co., Inc., stated that ethylene glycol has a flashpoint in the open cup of 116 deg. C. and in the closed cup of 122 deg. C., while its ignition temperature is 416 deg. C. In reply to a question it was stated that while ethylene glycol could be used in an engine originally designed for water cooling without material changes, it would be impossible to secure from such an engine as good performance as from one originally designed for ethylene glycol cooling.

Inverted Engine Easily Lubricated

Speaking on "In-Line vs. Radial Aircraft Engines," W. F. Davis, chief engineer of the Fairchild Engine Corp., said that every bearing of the inverted in-line engine, including the entire valve gear, can be readily pressure or flood-oiled and cooled, with a simple, natural flow of oil to the valve box cover as an oil sump. This cannot be satisfactorily or easily accomplished on a radial engine even with fully inclosed valve gear, and cannot be as easily or well accomplished on an upright in-line engine. The majority of troubles with a radial engine are in the valve gear, and are largely due to insufficient lubrication and cooling.

Another advantage claimed by the author for the in-line engine with overhead camshafts is greater rigidity, as a result of which oil leaks at casting joints (frequent with radial engines) are eliminated. Manifolding is a much simpler problem on the in-line engine, and satisfactory distribution can be obtained without the use of a blower. Much less trouble is

experienced as a result of changes in valve clearance in in-line than in radial engines. No compensation is required in the former type; with suitable compensating means the change in clearance with the latter type can be held to small values, but at the cost of complication and loss of reliability.

The in-line air-cooled engine has been scored on the basis that it is complicated or difficult to cool the cylinders satisfactorily and uniformly. Mr. Davis stated, however, that exhaustive tests with four, six and 12-cylinder V-in-line engines with simple scoop cowling had clearly demonstrated that this type of engine is very easy to cool. Variations of head temperature from cylinder to cylinder in the in-line engine are less than 20 deg. Temperature differences between the spark plug on the exhaust side and that on the intake side are limited to about 25 deg.

Air-Flow Over In-Line Engines

This uniformity of cylinder head temperature is due to the air flow scheme employed in cooling this type of engine. The air is introduced in a sheet aluminum scoop on the exhaust side of the engine. It is then deflected and passes between and around the cylinders, and passes out to the rear on the intake side. Thus the cylinders are effectively wrapped by the cooling air, receiving maximum benefit from a relatively small amount of air. The uniformity of head temperature is due, then, to the fact that the coolest air acts upon the hottest part of the cylinder, and that the metal-to-metal joint between the cylinder head and cam box assists in the rapid transfer of heat to a relatively large volume of metal. To produce these same desirable results in a radial air-cooled head requires individual cowling of each cylinder. This has been done, but is very much more complicated and expensive than the scoop cowl of an in-line engine.

The radial engine can be made much lighter for a given piston displacement, but this advantage is partly balanced by the restriction on the speed of the radial engine due to the greater concentration of inertia loads on its crankpin and in its valve gear. Improved visibility and reduced head resistance are other advantages of the inverted in-line engine.

In a paper on "Amphibion Design and Transportation," by Giuseppe M. Bellanca, which, in the author's absence, was read by an engineer of the Bellanca Aircraft Corp., the advantages of the amphibion were outlined as follows:

"Transportation with amphibion planes, if amphibions are made as strong as landplanes, over places appropriate to their type, is on the whole safer than with seaplanes or landplanes. The fact that one has a choice between land or water gives the amphibion a marked advantage over the seaplane and landplane.

"Another great advantage of the amphibion is the ability of getting from land to water and from water to land. Pulling a seaplane toward land or getting a seaplane or flying boat to the water is a cost-

ly affair. The amphibion renders all this quite simple. Housing an amphibion is far easier than a seaplane. The amphibion must carry an adequate pay load and must have sufficient range, high speed, must climb and take off well and must be strong and safe. To sacrifice any of these qualities to any extent would be a decided disadvantage."

Objections to Amphibions

In the discussion some of the objections to amphibions were brought out. Alfred A. Gassner of the Fokker company stated that the use of the amphibion in this country was more limited than generally supposed, because the use of bodies of water in the northern section of the country is impossible in winter time. Moreover, landing an amphibion on narrow streams and ponds of restricted area was subject to the same objections as landing a landplane on an unsuitable field.

It was conceded by some of those who mentioned objections to the amphibion that for private use it had certain definite advantages.

Jerome C. Hunsaker, vice-president, Goodyear-Zeppelin Corp., asked what percentage of the pay load would be required for the extra landing gear of the amphibion, and in reply it was stated that this represented from 5 to 7 per cent of the total weight of the airplane and about 30 per cent of the weight of the pay load. Mr. Gassner said that a plane of a gross weight of 7000 lb. has a landing gear weighing 400 lb., which agreed with the figures previously given.

The second paper on Tuesday afternoon was by Mr. Hunsaker, and dealt with Transoceanic Air Travel. In it he emphasized the advantages of lighter-than-air craft for ocean flight and at the same time pointed out the various disabilities of airplanes for such service. From the standpoint of safety the advantage is all on the side of the Zeppelin, Mr. Hunsaker asserted, and he pointed out that the Graf Zeppelin in its attempted flight to the United States had the crankshafts of four of her five engines break, yet she returned safely to port on her one remaining engine. It was also pointed out by the author that when the Graf Zeppelin later made the trip to the United States she deviated considerably from the projected course, with the object of avoiding unfavorable weather which was reported to her by radio. The ability to carry large reserves of fuel makes it possible for the airship to follow other than the shortest routes.

"THE fact that one has a choice between land or water gives the amphibion a marked advantage over the seaplane or landplane" . . . Giuseppe Bellanca, president, Bellanca Aircraft Corp.



The defense of the airplane was taken up by Col. James Fitzmaurice, who was one of the crew of the Bremen when she made the flight across the Atlantic from East to West during the spring of 1928. Col. Fitzmaurice said he considered aviation as a link in the whole scheme of transportation. As compared with surface transportation speed is the only advantage which aviation has to offer the prospective traveler, and he thought that the original cost, the maintenance cost, the docking cost and the operating cost of the airship were too high, while its speed was too low to interest the public. He believed, however, that Great Britain eventually would have a trunk line air service by airships between England and Australia, and that branch lines would be served by airplanes.

Transoceanic Flights Costly

The airplane today was still in a very early stage of its development, and the speaker ventured the opinion that if we could not look for at least 500 per cent improvement in airplanes in the next 10 years we might as well stop such development right now. Such development, however, will cost a good deal of money, and Col. Fitzmaurice intimated that money for the purpose of finding out what can be done in flying the Atlantic in heavier-than-air craft is very hard to procure. If as much money had been spent on the development of airplanes for transocean flights as was spent on the development of airships, ocean travel by airplane would be possible today, he said.

Col. Fitzmaurice did not believe in carrying passengers across the Atlantic in experimental machines, only mail and special freight. He did not expect to see in his lifetime a regular passenger service by airplanes across the North Atlantic. He said a cable company had offered to anchor a floating island in mid-ocean to serve as an intermediate landing point. The ability to refuel in mid-ocean would, of course, greatly increase the amount of pay load which could be carried.

Harold Brown raised the question of the comparative costs of equipment for transoceanic services by seaplane and Zeppelin, and the information was brought out that a Zeppelin for 100 passengers costs \$4,000,000, while landing facilities at each end cost a couple of million dollars additional, but no similar figures were furnished for an airplane service.

The first paper presented at the morning session on Wednesday was by Dr. Claude Dornier and dealt with the Dornier DO-X flying ship. It was presented by Lieut. C. H. Schildhauer, who is scheduled to fly the DO-X across the Atlantic some time in July or August next. A full description of this ship appeared in *Automotive Industries* of Aug. 3, 1929, as it was presented originally by Dr. Dornier before the Scientific Society for Aviation of Germany. Reading of the paper was followed by the presentation of a moving picture showing the trials of the DO-X on Lake Constance. It was stated by Lieut. Schildhauer that the ship had been up 58 times. A fairly long test flight over the Mediterranean is now contemplated, and if this proves successful the ship will be flown across the Atlantic in July or August of this year, depending

upon weather conditions. The following concluding remarks of Dr. Dornier in his paper are worth quoting:

"Aviation is now suffering from a general impression that we are farther advanced than we really are. Inferences are based on top performances, and far more is demanded of the airplane, the engine and the human element than they can reasonably give. Retrenchment must ensue. The increase in dimensions opens the way to cut down the demands upon material and the human element, and at the same time to remain in the realm of that which is profitable.

"When I look back upon the difficulties which we encountered in undertaking to build the flying ship, I must confess that the practical difficulties were relatively small in comparison with the financial and moral obstacles which had to be overcome. The popular remark that we were taking too great a leap caused me much trouble; and, after the successful outcome, there came the new comment that the flying ship was in advance of the needs of the time."

A paper on The Autogiro was presented by W. Laurence LePage, of the Kellett Aircraft Corp. The author said the details of Autogiro theory are very complex, particularly as regards the fundamentals of autogyration of the rotor system, but he developed an elementary theory which, except in so far as it neglects certain factors which are essential in actual design calculations, is nevertheless satisfactory in conveying a general understanding of the operation of a freely rotating windmill as a lifting system. The blades of the American-built machine rotate in anti-clockwise direction, viewed from above, at from 120-160 r.p.m. The blades are individually articulated at the hubs by

means of horizontal hinges at their roots, so that each blade is free to flap and is restricted only in the downward direction by droop cables which prevent the blades resting on the ground or striking other parts of the machine while stationary. In flight these cables are slack.

At the final technical session Lieut. A. J. Williams spoke on Speed Flying, and Major Leslie MacDill, on Commercial Aviation in the United States,

from the point of view of an Air Corps officer.

Lieutenant Williams recounted some of his experiences in handling fast planes. He said there seemed to be great competition between the various aircraft companies when developing new commercial planes, to outdo one another by a few miles per hour in speed. If the designers would call upon those men in their organization who had racing experience it would often be possible to make a great improvement in the speed of the planes.

Aviation Investment Growth

Major MacDill referred to the exceedingly rapid growth of investment in commercial aviation and expressed the opinion, based upon experience during the late war, that such rapid expansion would be accompanied by great waste. He expressed the opinion that it will be some time "before the organizations operating airplanes will be perfected and develop an earning power sufficient to continue the rate of expansion at much more than the recent arithmetical rate. Military

**"IN undertaking to build the
... DO-X ... practical difficulties were relatively small in comparison with financial and moral obstacles" . . . Dr. Dornier, designer of the DO-X.**

appropriations averaging \$50,000,000 for equipment and Post Office appropriations for contract Air Mail not exceeding \$15,000,000, led to the Government feeding something like \$65,000,000 worth of business a year into the industry. From supplying equipment a profit of not more than \$10,000,000 a year will be derived. Mail contracts should not use up equipment at any greater rate than a third of the yearly appropriation of \$15,000,000, and the profit on manufacturing this equipment may not exceed \$1,000,000. The profit on carrying the mail may not exceed \$3,000,000.

"Thus the total earning power becomes \$14,000,000, which would not justify a valuation of more than \$140,000,000 for concerns depending upon Government appropriations for business, if a conservative valuation of 10 times the earning basis is accepted as proper. Four years ago five times earnings was considered by the banker too high a valuation. Last year some bankers did not assume 20 times earnings too high to recommend to their customers."

Major MacDill also discussed the earning power which should be assumed for the valuation of the rest of the industry, such as passenger-carrying in connection with the carrying of mail and profits on sales of equipment to passenger-carrying lines.

Last year a valuation of the industry was made,

"THE aviation industry has been greatly over-appraised in earning value" . . . Major Leslie MacDill.

based on the share capital of about 80 per cent of the companies engaged in the business and the quotations of their stocks. When prices were at their peak these 80 per cent represented an investment of \$800,000,000. The stock market slump of last October reduced this appraisal to the neighborhood of \$400,000,000, and this was greater than the

book value of the companies considered, which was about \$300,000,000.

"An observer," said Major MacDill, "cannot think otherwise than that the aviation industry has been greatly over-appraised as to its value, and that the actual money invested in the business is a plowing-in of capital with the hope that, at a considerably later date, development of better methods of operation and quality of service will produce earnings justifying the present investment of capital."

By way of encouragement he added that he felt the industry would be able to develop types of airplanes which will reduce the cost of passenger-carrying and freight transport to such an extent that well-planned schedules of operation . . . will produce earnings; also, that he had many reasons for believing that the use of airplanes for sport, private and business purposes will show such marked increase as to make well worth while the development of equipment and servicing.

Consolidation Necessary to Balance Industry

BECAUSE of its size, diversity of activity and volume of business done, adoption of a line-and-staff procedure became necessary in the General Motors Export Corp., according to Edgar W. Smith, assistant to the president. This organization, he told the Spring Convention of the American Management Association Tuesday in the Hotel Astor, New York, is one in which a line officer has charge of all activity in a specific territory; a staff officer concerns himself with a specific activity.

"It is obvious that the planning, coordination and control of results under various specialized aspects such as sales, finance, manufacturing and supply is equally a practical impossibility. The management, therefore, finds it expedient and necessary to allocate the responsibility for doing the greater part of this work to a number of men, each of whom is charged with assisting and advising the management in the particular work for which he has been chosen, and for all the territory under the management's jurisdiction. This is, essentially, the origin of staff," he explained.

Ray B. Prescott, merchandising counsellor, told the meeting that a number of consolidations will be required to bring about the necessary balance in industry, thrown out of pace by the war.

Some of the industries in which mergers are necessary to solve marketing problems and to increase earnings are the automotive, tire and the textile industries, he said.

"In the automotive industry there are 30 passenger car manufacturers with a capacity for about 7,000,000

cars a year, striving for a market that will consume this year about 4,000,000 passenger cars. To further heighten the gloom, 92 per cent of this business will be taken by seven manufacturers. The same condition is similarly true among the truck manufacturers, where 20 per cent of the manufacturers do 80 per cent of the business.

"A merger of some of the independent car manufacturers into one or two large units similar to General Motors would permit the elimination of certain models for which there is little or no demand and allow for concentration of effort on the profitable models.

"It would also tend to cut down on some of the excess capacity and very materially reduce unsatisfactory competition by removing from the market certain cars that are being sold simply because of excessive trade allowances, given by dealers handling them, on used cars. The combination resulting from such a merger should ensure a corporation large enough to have a research staff, headed by a highly trained executive. Such a staff should be able so to plan the distribution of the product that much of the instability in the industry could be eliminated.

"In the parts field," Mr. Prescott said, "a merger of complimentary products, entering into the construction of the car, would give such an organization enough financial strength easily to resist the temptation of supplying the car and truck manufacturers with parts without a reasonable profit, and it would also give them sufficient size to develop the replacement side of the business."

Speed Kings Prepare for Annual

Modified passenger car engines as well as special plants ranging from 100 to 336 cu. in. displacement entered in Decoration Day race at Indianapolis.

WITH four, six, eight and sixteen-cylinder cars having displacements ranging from 100 to 336 cu. in. entered in the Indianapolis race, it would seem that the new race rules are living up to the expectations of their originators. The entries are varied not only as to type but make as well, for there are approximately ten different makes represented. One foreign maker, Maserati of Italy, is sending two cars, a V sixteen and a straight eight, and two distinctly stock jobs are entered, a du Pont and a Stutz. The former a factory entry and the latter by a private individual. In addition, there are several race cars powered with modified passenger-car engines.

Estimates of the average speed for the race range

from 85 m.p.h. up. In this connection it is interesting to note that Louis Meyer in a 91 cu. in. single-seater

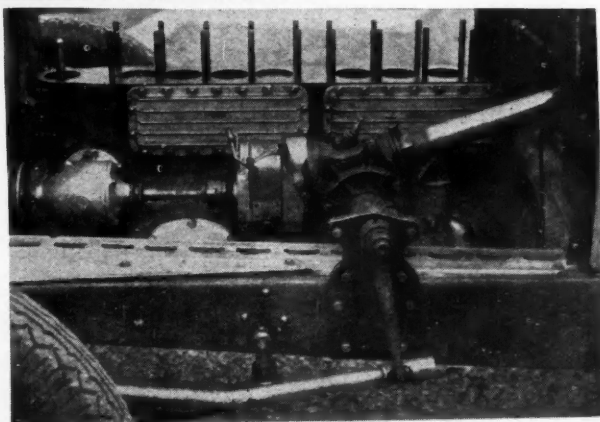
fitted with a single carburetor did a lap at a fraction better than 100 m.p.h. Louis Schneider, who was the first man to have a completed car at the track, has made several laps at approximately 103 m.p.h.

While the small-bore multi-cylinder engines have the advantage of high engine speed, the four-cylinder cars should be easier to carburate, and many believe that the race will be won and lost by the carburetors and manifolding. With the superchargers removed, the race cars are, for the most part, using higher compression ratios, and considerable experimenting is being done on carburetors and manifolds. According to the drivers and mechanics of the cars fitted with modified passenger car engines, improved carburetion, higher compression ratios, magnetos and increased bearing clearances will enable them to compete with the cars equipped with engines designed for racing.

Interest will undoubtedly center in the two 16-cylinder entries, the Sampson Special and the Maserati. However, it is scarcely fair to call these cars "freaks," since there is a 16-cylinder passenger car in regular passenger car production.

The Sampson Special has a bore and stroke of $2\frac{5}{16}$ by 3, resulting in a displacement of 201 cu. in. Two parallel banks of eight cylinders each, with individual crankshafts, placed 12 in. apart, rotate in a common crankcase. Five main bearings are provided for each shaft. A spur gear, mounted on the front end of each crankshaft, meshes with a gear on the end of a hollow ground shaft 26 in. long, which passes between the cylinder blocks to the driving member of the clutch. As the engines rotate in a counter-clockwise direction, the driveshaft rotates clockwise.

In accordance with usual race car practice the pistons are of light alloy construction, and it is understood that they are of Ray Day manufacture, fitted with three Perfect Circle rings. Connecting rods



There will be five race cars powered with the Model A Duesenberg passenger car engine. The lower illustration shows the engine to be used by Bill Alberti. Note how the steering column was raised to obtain better steering geometry

The Alberti entry was originally a Duesenberg roadster and the wheelbase was shortened to $104\frac{1}{2}$ in. Note how the torque tube was reduced in length (upper view)

500-Mile Classic

By
W. K. Toboldt

Technical Editor
Automobile Trade
Journal and Motor Age

are tubular steel, and crank pins are $1\frac{5}{8}$ in. in diameter and $1\frac{3}{8}$ in. long. The overhead camshafts, of which there are two for each bank of cylinders, are driven through shaft and gearing at the rear of the engine. Jedson valves $1\frac{3}{16}$ in. in diameter have been selected. Piston pins are $\frac{5}{8}$ in. in diameter and full-floating.

The cylinders are cast four in each block, with integral heads. Crankcase and oil pan are of aluminum, the latter being externally ribbed for strength and to provide additional radiating surface for cooling the oil.

Two Robert Bosch magnetos, with shafts at right angles to the crankshafts are driven from the front end of the driveshaft. One spark plug is provided for each cylinder. According to Riley Brett, who is in charge of the design and building of the Sampson Special, the compression ratio will be approximately 9 to 1.

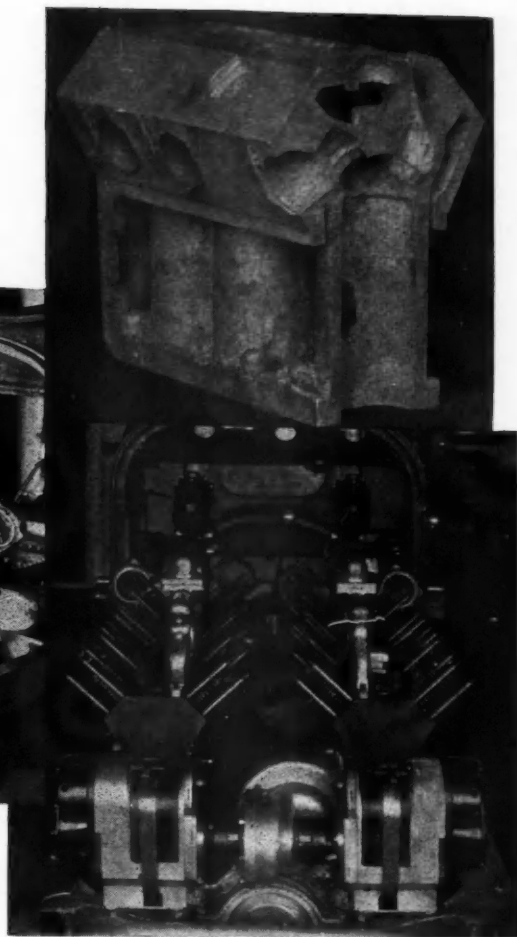
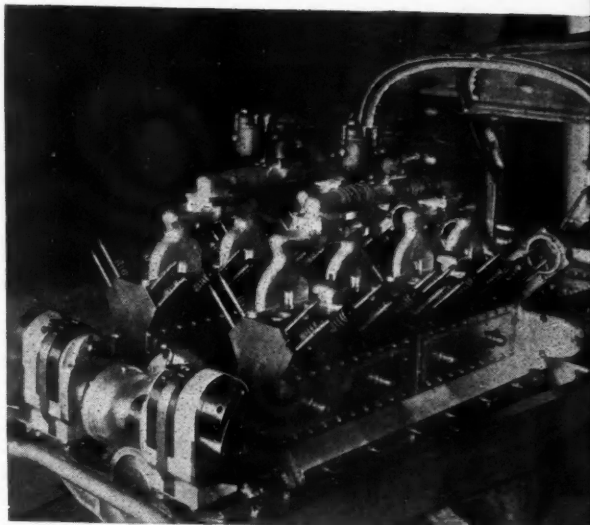
Carburetors and manifolding are of the complete downdraft type, as are the valve ports in the cylinder head. The radiator is divided vertically, a separate section being provided for each bank of cylinders.

From the plate clutch and three-speed transmission, the drive to the $\frac{3}{4}$ -floating rear axle is through a Mechanics universal joint and enclosed propeller shaft. Driving reactions are taken by the torque tube.

Wheelbase of the Sampson Special is 103 in., and the weight is given at 1950 lb. This gives approximately 9.75 lb. per cu. in. of displacement.

The engine of the Maserati, the other 16-cylinder car, is of the V-type with a bore and stroke of 2.44 and 3.25 in., giving a displacement of 241 cu. in. Two overhead camshafts are provided for each block and operate inclined valves in the head. Carburetors are placed between the two banks of cylinders. Cylinders are of steel with sheet metal jackets. Lubrication is of the dry-sump type with an oil-cooling radiator below the water radiator.

It is the Maserati which captured the world's 10-kilometer flying record at Cremona, Italy, in Sep-



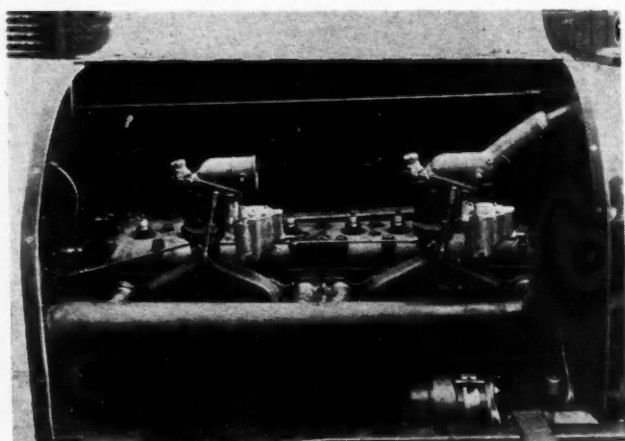
At the top of the above group is a cross-section of the Sampson Special cylinder block. Note the downdraft intake port

A view of the Sampson Special 16-cylinder engine to be driven by Louis Meyer (left). Complete downdraft carburetor and manifolding is a feature. The two banks of eight cylinders are parallel with individual crankshafts geared together at the front end (right). The propeller shaft passed between the cylinder blocks to the single clutch and gear set

tember, 1929, at an average speed of 152.89 m.p.h. However, this speed was made with the aid of a supercharger. The other Maserati, a straight eight, has a displacement of 122 cu. in.

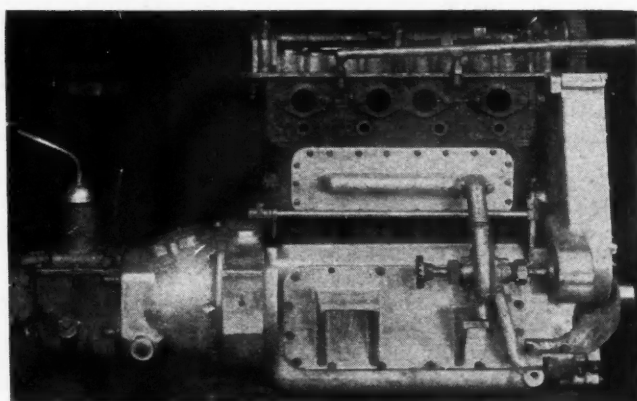
In all, there are nine Duesenberg cars entered, three of the former 91 cu. in. jobs, in which the displacement has been raised to 150 cu. in.; five powered with the original Duesenberg passenger car engine, designated the Model A, and a single 300 cu. in. model.

Pete DePaolo's entries are of particular interest. Both of these are powered with Duesenberg Model A engines on which the stroke has been reduced $\frac{3}{8}$ in. to $4\frac{5}{8}$ in., resulting in a displacement of 244 cu. in. Since these cars weigh 1855 lb., there is approximately 26 lb. per cu. in. of displacement. The cylinder heads have been altered to give improved cooling around the valves and, in addition, a special camshaft, which is required because the rocker arms have a mechanically operated return so that the valve springs have only to operate the valves and the operation of the rocker arm is taken care of by the cam. It is expected that this design will materially increase the speed of the engine. It is also understood that DePaolo may use



A popular passenger car straight-eight engine of $3\frac{1}{2}$ by $4\frac{3}{8}$ in. bore and stroke will be used by Russell Snowberger in the Russell Eight (above). The Romthe Special is using the same make power-plant. The manifolding is unconventional, as the firing order is 1-6-2-5-8-3-7-4

It is understood that the Clemons four-cylinder engine (right) will be used in the Hoosier Pete Special and another car to be driven by Speed Gardner. Model A Ford crankshaft and rods are used. The displacement is 197 cu. in.



the L.G.S. clutch as a free-wheel device. With the exception of the stock cars DePaolo's cars have the largest wheelbase, which is 114 in. Clutch, transmission and axles are the same as used in the Model A Duesenberg passenger car.

The Model A Duesenberg entered by Bill Alberti, and which has been altered under the direction of Jim Calvert, has a wheelbase of $104\frac{1}{2}$ in. It is quite possible that this engine will be fitted with the original type of cylinder head which has been in use several years. Naturally, the shorter wheelbase necessitated a reduction in length of the torque tube. The manner in which this was executed is shown in one of the illustrations.

The three Duesenberg race cars are similar in design to the former 91 cu. in. model, but the displacement has been increased to 150 cu. in. Naturally the frames have been widened to permit the use of the two-man body. Carburetors are manifolding, while not complete at the time of writing, are understood to be of the downdraft type.

The Nardi Special, consisting of a Mercedes chassis and Model A Duesenberg engine, is featured by an unusual rear spring suspension. The rear spring mounting consists of two $\frac{1}{4}$ -elliptic springs on each side. The springs are mounted end to end, with the thin end of the spring at the rear axle and the heavy end of each spring bolted rigidly to the frame. The forward one of the springs on each side is attached to the axle housing by an ordinary shackle, while the rearward spring floats in a roller arrangement on top of the axle housing.

Considerable interest is being shown in the Miller-Schofield Special to be driven by Shorty Cantlon. This

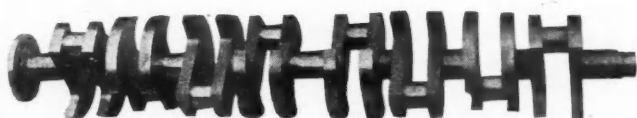
is equipped with a four-cylinder engine of 151 cu. in. displacement with two overhead camshafts. The Empire State Special, with Wilbur Shaw at the wheel, is also of interest. This is another Miller-engined four-cylinder job, and is the same engine which established some new records at the Syracuse track.

The eight-cylinder Millers for the most part have been increased to 150 cu. in. displacement. In some cases, such as the cars to be driven by Seymour and Huff, the displacement has been raised to only 100 cu. in. Incidentally, the last two mentioned are the former Cooper Specials.

Other than that the displacement is 151 cu. in. and the weight is 1750 lb.; nothing is known of the front-drive Miller-engined car entered by Harry Hartz.

While the official entry list states that Hartz will drive, many of the drivers believe that Bob McDonough will be at the wheel.

One of the cars built especially for the race, and known as the Morton & Brett Special, is powered with a straight-eight engine of 3 in. bore and 4 in. stroke. The firing order is 1, 6, 2, 5, 8, 3, 7, 4, and the five-bearing crankshaft is featured by having two counterweights



The Morton & Brett Special crankshaft has two counterweights for each rod, weighing twice the weight of the rod and piston assembly



Manifolds are built into the Morton & Brett cylinder block, tending to stabilize temperature conditions

for each connecting rod. According to Morton and Brett, the combined weight of the counterbalances is equal to twice the weight of the rod and piston assembly and results in an exceptionally smooth-running engine. Carburetors are of the updraft type, with the manifold cast in the block. Camshafts above the cylinder block operate inclined valves in accordance with usual race car practice. Two plugs are provided for each cylinder, and approximately 235 hp. are claimed for this 226 cu. in. powerplant.

An Emmons four-cylinder engine will be used in the Hoosier Pete, and the car to be driven by Speed Gardner. This engine, which is built around a Model A Ford crankshaft, has seen several seasons, dirt-track racing. Crankcase, cylinder and block and heat are of special design, however. The overhead camshaft, driven by a silent chain, operates on cups or pistons which cover the ends of the vertical valves. Two spark plugs are provided for each cylinder, and ample cooling is provided around the plugs and valves.

The Romthe Special and the Russell Eight are both powered with the same make of straight-eight engine which is used in a current model passenger car of popu-



Last year's car (91 cu. in. engine) compared with the new two-seaters. Louis Schneider, shown at the wheel of the new type (right), was the first man to get his car finished. Displacement on this job has been increased to 151 cu. in.

lar make and which has a bore and stroke of $3\frac{1}{2}$ by $4\frac{3}{8}$ in. The displacement of 337 cu. in. is one of the largest entered in the race. The engine is of the

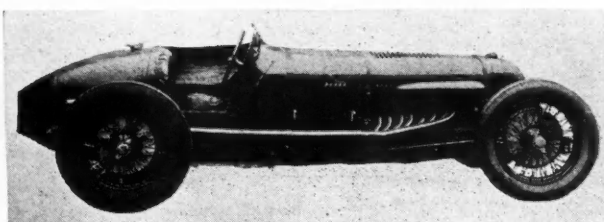
Entries in the Indianapolis 500-Mile Classic

Car	Driver	No. of Cylinders Bore and Stroke	Displacement	Weight	Valve Arrangement	Engine Make or Type
Miller-Schofield Spl.	Cantlon	4—3.4 x 4.125	151	....	OH	Miller
Unnamed	Allen	4—3 $\frac{3}{4}$ x 4 $\frac{1}{2}$	183	1,750		
Maserati	Borzacchini	16—2.44 x 3.25	241	....	OH	Miller
Chrysler	Gaudino	6—3 $\frac{1}{2}$ x 5	288	....	L	Passenger Car
Coleman Front-Drive	Shafer	4—3 $\frac{3}{4}$ x 4 $\frac{1}{2}$	183	1,800		
Coleman Front-Drive	Moore	4—3 $\frac{3}{4}$ x 4 $\frac{1}{2}$	183	1,800		
Sampson Spl.	L. Meyer	16 (2)—5/16 x 3	201	1,950	OH	Race
Duesenberg	DePaolo	8—2.895 x 4 $\frac{1}{2}$	244	1,855	OH	Duesenberg Model A
Duesenberg	Unnamed	8—2.895 x 4 $\frac{1}{2}$	244	1,855	OH	Duesenberg Model A
Miller, F. D.	Hartz	8—2 $\frac{1}{2}$ x 3 $\frac{1}{2}$	151.5	1,750	OH	Miller
Unnamed	Z. Meyer	8—2.515 x 3 $\frac{1}{2}$	151.5	1,750	OH	Miller
Guiberson Spl.	Triplett	4—3 $\frac{3}{4}$ x 4 $\frac{1}{2}$	198	1,750	OH	
Unnamed	Schneider	8—2.625 x 3 $\frac{1}{2}$	151	....	OH	Miller
Mavv Carburetor Spl.	Gulotta	4—3.406 x 4.125	150.4	1,775	OH	
Mavv Carburetor Spl.	Kenealy	4—3.406 x 4.125	150.4	1,775	OH	
Slade Spl.	Slade	6—3 $\frac{3}{4}$ x 5	268	2,220	L	Passenger Car
Duesenberg Spl.	Unnamed	8—2.893 x 5	260	1,985	OH	Duesenberg Model A
Empire State Spl.	Shaw	4—3 $\frac{3}{4}$ x 4 $\frac{1}{2}$	183	....		Miller
Buckeye Spl.	C. Gardner	8—2 $\frac{1}{2}$ x 3 5/32	150	....	OH	Duesenberg
Decker Spl.	Decker	8—3 x 5 $\frac{1}{4}$	300	....	OH	Duesenberg
Stutz	Unnamed	8—3 $\frac{3}{4}$ x 4 $\frac{1}{2}$	322	3,345	OH	Stutz
Russell Eight	Snowberger	8—3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	337	2,550	L	Passenger Car
du Pont	Moran	8—3 $\frac{3}{4}$ x 4 $\frac{1}{2}$	322	3,350	L	du Pont
Fansin Jr. Spl.	Fansin	8—3 $\frac{1}{4}$ x 5	332	....	
Morton & Brett Spl.	Klemos	8—3 x 4	226	1,765	OH	Morton & Brett
Romthe Spl.	MacDonald	8—3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	337	....	L	Passenger Car
Unnamed	Marshall	8—2.890 x 5	262	....	OH	Duesenberg Model A
Butcher Bros. Spl.	Butcher	6—3 $\frac{3}{4}$ x 5	331	2,700	L	Passenger Car
V-Eight	Burton	8—3 7/16 x 3 $\frac{3}{4}$	251	....		V-8 Passenger Car
Unnamed	Evans	8—	...	....
Betholine Spl.	Farmer	8—2.51 x 3.50	151	....	
Unnamed	W. Gardner	4—3.826 x 4 $\frac{1}{4}$	197	....	OH	Clemons
Fronty Spl.	Miller	4—3 $\frac{3}{4}$ x 4	176	....	OH	
Maserati Spl.	Cucinatto	8—	125	....	OH	Maserati
Ambler Spl.	MacKenzie	6—3 $\frac{3}{4}$ x 4 $\frac{1}{4}$	255	....	OH	Passenger Car
Nardi Spl.	Denver	8—2.893 x 5	260	2,030	OH	Duesenberg Model A
Trexler Spl.	Trexler	8—3 $\frac{1}{4}$ x 4 $\frac{1}{2}$	298	2,450	L	Passenger Car
Duesenberg Spl.	Litz	8—2 $\frac{1}{2}$ x 3 5/32	150	....	OH	Duesenberg
Unnamed	Seymour	8—2 5/16 x 3	100	....	OH	Miller
Unnamed	Huff	8—2 5/16 x 3	100	....	OH	Miller
Hoosier Pete Spl.	Unnamed	4—3.820 x 4 $\frac{1}{4}$	197	....	OH	Clemons
Duesenberg Spl.	Stapp	8—2 $\frac{1}{2}$ x 3 5/32	150	....	OH	Duesenberg
Duesenberg Spl.	Unnamed	8—2 $\frac{1}{2}$ x 3 5/32	150	....	OH	Duesenberg
Scranton Spl.	Greco	4—	...	....

L-head type, and the camshaft is driven by a gear. The Russell Eight will weigh approximately 8 lb. per cu. in. of displacement and is fitted with two downdraft Marvel carburetors.

Another passenger car engine which has found its way into a racing chassis is the V eight, entered by Ira Vail and which will be driven by Claude Burton. This engine has horizontal valves.

A Stutz, entered by Milton Jones of Cleveland, and a du Pont, a factory entry, will be of particular interest to the stock car fans. Both are stock speedster models with fenders and windshield removed. In each case the displacement is 322 cu. in., but the Stutz, with



Maserati 16-cylinder race car which established a record of 152.89 m.p.h. for 10 km.

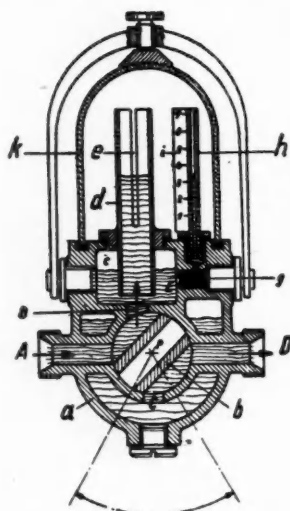
a weight of 4350, is approximately 1000 lb. heavier than the du Pont.

Another car which may be in this stock car class is the six-cylinder Chrysler of 3½ by 5 in. bore and stroke, entered by Juan Gaudino. However, details of this car are not available, but it is probable that the

powerplant will be placed in a racing chassis. The Slade Special, Fansin Jr. Special, Butcher Brother Special, Ambler Special, Trexler Special are also powered with modified passenger car engines in racing chassis. The Ambler Special engine has overhead valves operated from a camshaft in the crankcase mounted in a Mercedes chassis.

Dornier Flowmeter Reduces Throttling Effect

A NUMBER of instruments, referred to as flowmeters, have been devised which enable one to read off the rate at which a fluid flows through a tube. Most of these, however, are based on the principle of



Sectional view of Dornier flowmeter

compelling fluid to pass through an orifice (which causes a considerable pressure drop) and measuring the pressure drop, which varies with the rate of flow. Throttling the flow in this way is sometimes undesirable, and the elimination of this throttling effect is the principal advantage of a flowmeter, which has been developed by Dornier Metal Construction, Inc., Friedrichshafen, Germany, of which we find a description in *Automobiltechnische Zeitschrift*.

A sectional view of the instrument is shown in the illustration. The fluid whose rate of flow is to be measured enters the housing *a*

at *A* and with the cock in the position shown, the fluid enters a small air chamber *c* and rises in the latter in the standpipe *d*, flowing from the standpipe through the slot *e*. The fluid then descends into the lower part of the housing *a* (through orifices not shown in the drawing) and at *C* passes into the housing of the cock, leaving the meter at *D*. Under the slight over-pressure in the air chamber *c*, a small portion of the fluid at *E* enters the color cartridge *g* and passes from there to the sight glass *h*. The height of the column of fluid in the sight glass and, consequently, the amount of fluid passing through the instrument in unit time, can be read off from the scale *i*. The standpipe and sight glass with scale are covered by an easily removable glass dome.

Should the glass dome be injured or should it become necessary to remove the mechanism in order to replace the measuring tube *d*, the cock *b* is turned through an angle of 45 deg., whereupon the fluid flows through

a drilled passage directly from *A* to *D*, and the flowmeter is then entirely out of circuit. By attaching two capillary tubes to the apparatus it is possible to take remote readings, up to distances of about 30 ft. It is also possible to connect several remote indicators and recording devices at the same time. Remote readings are based on the pressure difference between the pressure chamber *c* and the glass dome *k*. This measurement may be made either pneumatically or hydraulically. For measurements to be taken at greater distances an electrical transmission apparatus can be made use of. If the flow of the fluid is subjected to impulses it is desirable to insert a damping device in the circuit. It is immaterial whether the instrument is incorporated in the suction or in the pressure line of the pump causing the flow. It is claimed that the accuracy of the instrument is independent of the temperature and specific gravity of the fluid, within the limits of 0.6 and 1 temperature. In the case of very viscous oils the apparatus must be calibrated by inserting a measuring tube of a size corresponding to the viscosity of the particular fluid. The standard design indicates rates of flow from 50 to 250 liters per hour and has connections adapted to take tubes of 20 mm. (about 25/32 in.) inside diameter.

Who Takes the Trick?

(Continued from page 752)

always have been inherent in the situation, there is indicated a slow change, the general investments of which are well worth investigating and discussing at once.

A frank analysis of practical future procedure, first from the standpoint of the vendor parts makers and then from that of a vehicle manufacturing executive, may show the ultimate interests of both to be less far apart than immediate differences might indicate.

However that may be, the next article in this series—which will appear next week—will outline the broad functions performed by the vendor parts manufacturers in the past as a background upon which to discuss in the third and fourth articles the two points of view just mentioned.

Just Among Ourselves

Seasonal Sales Slumps and the Production Curve

IF the automobile sales curve could be leveled out, then the much talked of fluctuations in the production curve would pretty well take care of themselves. And there are a good many pessimists who will argue with considerable logic that just as long as the sales curve shoots up and down throughout the various months of each year, the production curve of the automobile industry will follow it to a considerable degree.

That's one of the first thoughts which came to us as we sat down yesterday to try to answer a letter from the Committee to Study Methods of Reducing Seasonal Business Slumps. The letter asked for some information about what caused seasonal fluctuations in the automobile business.

Having heard so much about these seasonal slumps in our business, it seemed to us as though there must be a great mass of reasons for them. So we got out a sheet of paper and started in to make a list.

* * *

Weather Appears to be Major Factor of Influence

WE started off by writing down "Weather." Weather, in all of its ramifications, certainly has a major seasonal effect on automobile sales. In the Northern States, sales curves show a definitely seasonal trend year after year; up in the spring, decline in the summer, and down further in the winter.

But look at the sales curves covering a period of years for the Southern and Western States. No such regular seasonal effect of weather is to be

noticed. The curve for the Far West is nearly a straight line.

In other words, weather seems to be the one outstanding major factor in the whole situation.

Where there is a definite difference in weather during summer and winter, so far as cold and heat are concerned, sales fluctuate. Where the weather never gets very cold, the sales curve fluctuates relatively little on any regular seasonal basis.

* * *

Other Influences Tend to Balance Each Other

AFTER having written down "Weather" and let our mind wander over the foregoing aspects of its relation to car sales, we tried to think of something else to add to the list. The longer we thought, the more barren became our cogitations.

Crops? Yes, but they tend to balance out, taking the country as a whole. Seasonal employment in other industries? Yes, but doesn't that tend to balance out, too?

No, Old Man Weather seemed to stand alone and solitary as the one really powerful shaker of the automobile sales curve. Where he appears in his most varied forms, there the sales curve jumps and dips. Where he preserves a more or less benign and little-varying countenance, there the sales curve merely trembles, except as it is moved by fundamental cyclical movements unrelated to any yearly routine.

* * *

Make Cars to Conform to Temperature Variations

IF the foregoing reasoning has in it anything of truth, then, the one best way to achieve a greater degree of sales equality

between the various months of the year is to improve ways and means of increasing automobile use and driving comfort during those periods when the fickle old fellow, Weather, blows too hot or too cold. He forces the sales curve downward worst, of course, when he's blowing cold.

The closed car is the greatest feature of this kind yet developed. Accessories to make cars more comfortable for winter driving, and engine improvements to make easier starting in particular, and winter operation in general, have contributed to keeping the sales curve from being even more unstable. Special sales drives in winter and off-selling seasons have been tried and have helped.

Increase in highway mileage suitable for all-year use and snow removal activities are other factors which have helped upset Old Man Weather's machinations. Development of export sales should also be mentioned.

The curve of total car sales, it must be remembered too, shows marked seasonal fluctuations because a great majority of the cars are sold in areas where winter and summer are definitely different temperature seasons.

* * *

Constant Repairs Needed for Artificial Channels

CAN anything more be done in the future? Perhaps so; perhaps not.

Aside from trying to battle Old Man Weather, though, the only means of stabilizing the sales curve which occur to us consists of attempts to force sales through artificially constructed channels, whose walls might be found to be constantly in need of repair.—N.G.S.

Mass Production Method Applied of Oakland V-Eight Engine

Certain difficult single operations which would slow up multiple spindle set-ups are singled out and performed on special units, interspersed where necessary

INTEREST of the production man in the new Oakland eight-cylinder cars centers about the problems and manufacturing methods involved in the building of the new type cylinder block. The 90-deg. V-type engine is no longer new but it does intrigue the imagination to have an engine of this type designed and built for a car of moderate price. It was, therefore, with more than usual interest that we availed ourselves of the opportunity to follow through the foundry processes and the new machine shop layouts at the plant of the Oakland Motor Car Co.

All the cylinder blocks are cast in their own foundry, located at the Pontiac plant. It is one of the most modern in the automotive field, being completely conveyorized and equipped with the last word in labor-saving devices. The new cylinder block is molded exclusively by the dry sand process, no green sand whatever is used. The coring is so intricate that many problems were met and had to be overcome before the job was reduced to a

routine performance. To visualize some of this detail, in Fig. 1 is shown a random set-up of some of the core pieces used on this job. Unquestionably, much of the engineering skill, foundry technique and planning devoted to the new engine were centered about the initial foundry problem.

The machine shop layout has been so ably conceived that one instinctively senses the smooth, rhythmic progression from one operation to the next. The cylinder block threads its way through three parallel lines of machines and immediately proceeds to the initial assembly operations.

Machine tool equipment is of the latest type,

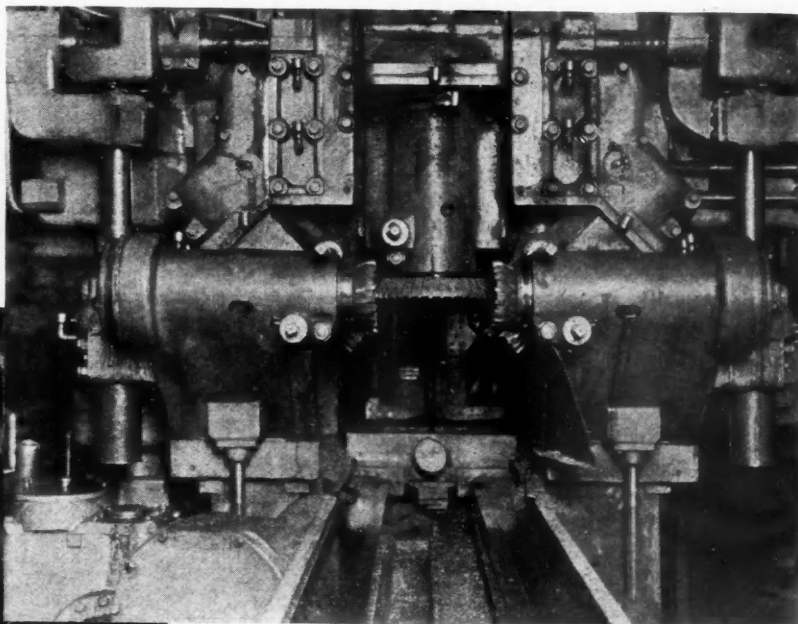
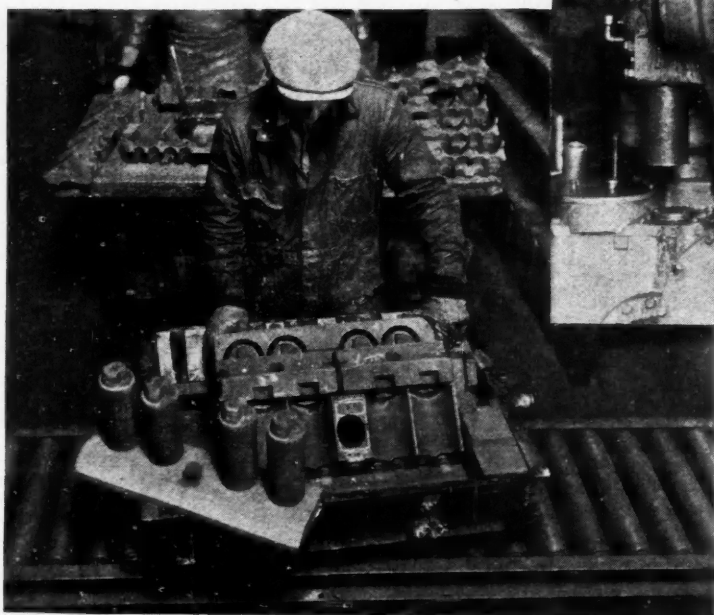


Fig. 2—Cutter set-up on Ingersoll planer type milling machine for rough and finish-milling of the cylinder head and top of block

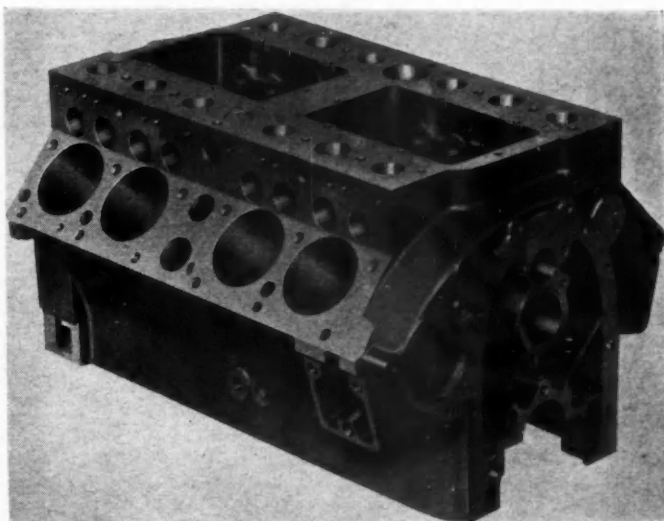
Fig. 1—Close-up showing some of the dry sand core pieces used on the Oakland V-type eight-cylinder block

in Manufacture

By JOSEPH GESCHELIN

especially adapted to a high production rate. For example, there are two large planer-type milling machines for the top and bottom faces of the block and two large drum-type milling machines for the sides. Two-way and three-way drilling machines are employed wherever possible, one of the three-way machines having 60 spindles. By virtue of the cylinder block construction, operations of boring, reaming and honing are accomplished on four-spindle machines equipped with circular indexing tables, enabling the operator to complete one cylinder block by indexing it in two different positions without changing the set-up.

Extending a highly successful practice in the routing of the job, certain difficult single operations, such as the drilling or reaming of odd holes, unusually



The completely machined Oakland V-8 cylinder block

long holes and holes that set at odd angles, which would certainly slow up multiple spindle set-ups, have been singled out and are performed in special set-ups on single spindle, two spindle, and multiple head machines, which are interspersed where necessary. Another striking feature of the layout is the use of repair operations and utilization of machines to facilitate these operations along the line in order to speed the progression of the block through the high cycle multiple-spindle machines. All the operations are linked by a roller conveyor which has built into it at strategic locations, trunnion type box fixtures enabling the operator to turn the block over as it moves from one operation to the other.

The machine shop operates on the group system, the entire force within that department constituting one single group. This makes it perfectly feasible to work the inspection operations in on the line so

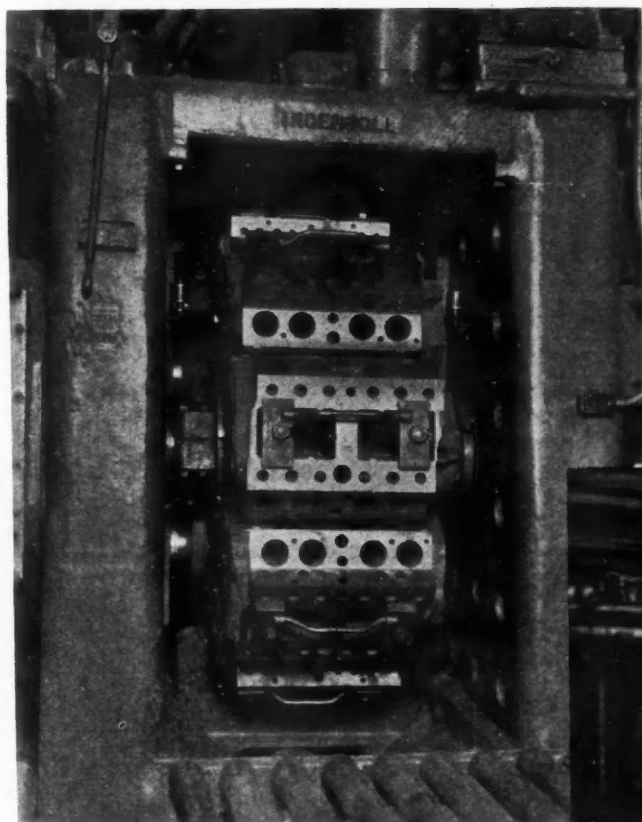


Fig. 3—Close-up view of the fixture of drum type Ingersoll milling machine set up for rough and finish milling both ends of the block

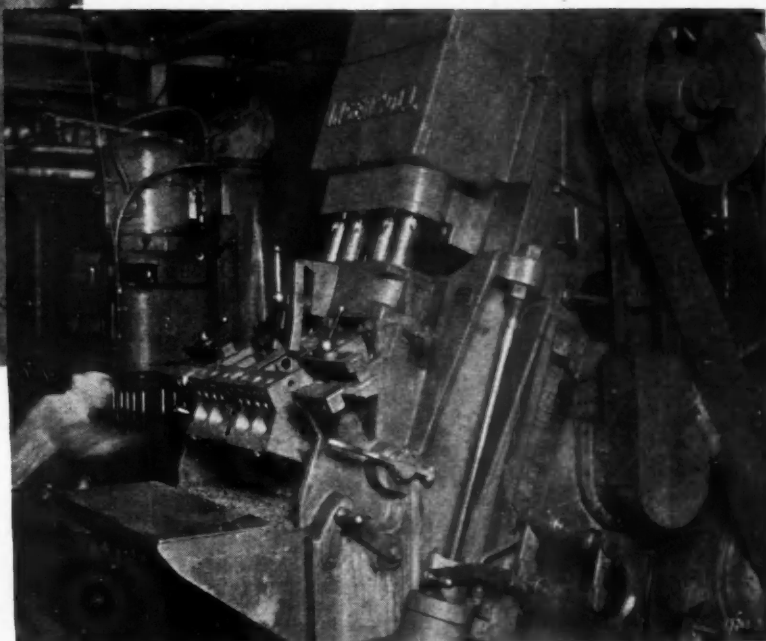


Fig. 4—Rough boring cylinder bores on four-spindle Ingersoll, with inclined head

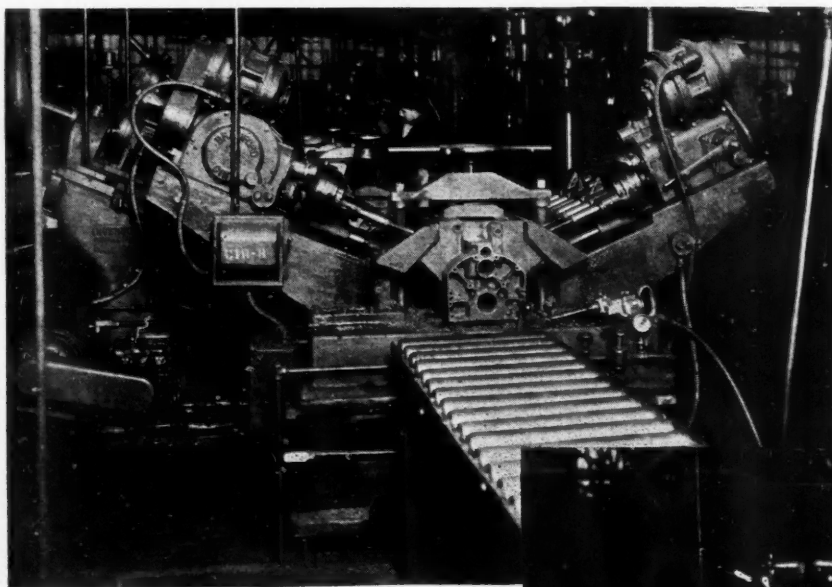


Fig. 5 (left)—Drilling cylinder bolt holes. This machine consists of an Ingersoll base with specially adapted Bradford heads

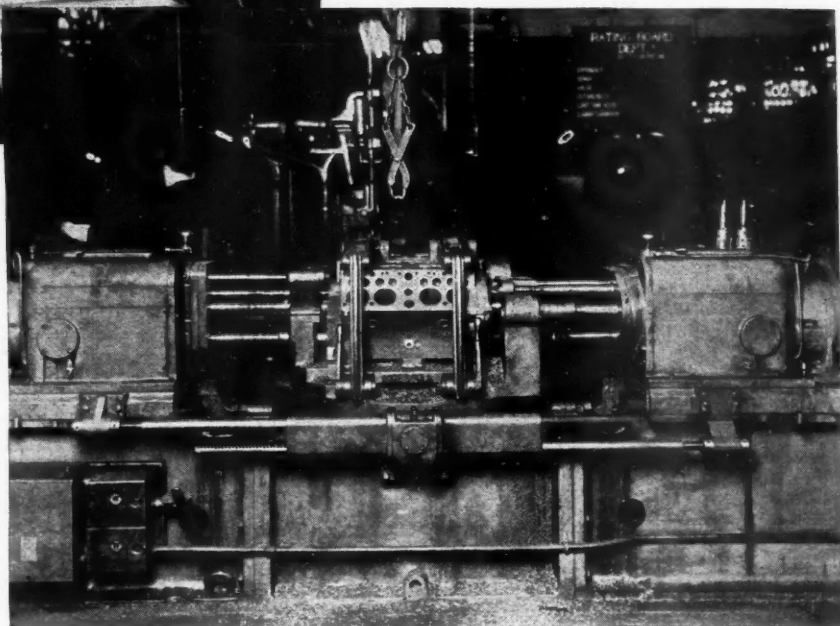


Fig. 6 (below)—Double-end Ingersoll boring machine for boring Oakland V-8 crankshaft, camshaft water pump and lifter shaft holes

that key operations are automatically checked as the block progresses through the department. As a result, the inspection operations are intimately interwoven with the machine operations.

Foundry operations on the Oakland cylinder block center upon the dry sand process. The molds are progressively built up on individual cores which are formed in steel molds and thoroughly baked. Each individual core piece is carefully filed and gaged before it is sent to the assembly line. All parts of the flask are metal and the inside structure is built up from the baked cores as the flasks move from station to station on the conveyor. At each station the core structure is carefully checked by means of gages with which the operator is provided. After pouring, the molds are shunted to one side and are permitted to cool for $2\frac{3}{4}$ hr. before they are shaken out. Then the mold is knocked apart, the block hoisted on to an overhead conveyor and carried out into the yard to cool in the open. The blocks are tumbled, chipped, sand blasted, water tested and then have the locating pads milled before proceeding to the machine shop. Next the block passes to the washing machine, thence to a spray booth, where the interior is sprayed with an engine enamel.

Fig. 2 shows the rough and finish-mill of the top and cylinder head faces on an eleven-spindle, double-faced Ingersoll milling machine, planer type. The block then progresses through a number of other milling operations, including the rough and finish-mill of the front and rear end on a six-spindle, drum type, Ingersoll milling machine, shown in Fig. 3.

Rough boring the cylinders is performed in a rather interesting way, as shown in Fig. 4, on an Ingersoll four-spindle machine with an inclined head. The table is hydraulically operated and feeds the cylinder block in its fixture directly to the cutter. A circular table indexes the other set of cylinders without disturbing the setting. As an example of

a special operation to relieve the burden of the multiple-spindle set-up, Fig. 5 shows a ten-spindle drilling machine built up from individual Bradford drilling heads. Another example taken at random is a No. 2B Edlund drill machine which redrills a 29/64-in. hole to a depth of $2\frac{3}{4}$ in.; this set-up also takes care of the tapping of one $\frac{1}{4}$ -in. pipe tap hole. Odd operations of a similar character will be found at several other points in the machine shop line.

In succeeding steps the center and the end bearing caps are assembled, the bearing sides milled and finally all bearings core drilled on a two-way, two-spindle Ingersoll horizontal boring machine.

Crankshaft bearing holes, camshaft bearing holes and bearings for various accessory shafts, are semi-finish bored in separate set-ups on two double head, four spindle, Ingersoll horizontal boring machines. A view of the semi-finish boring operation is shown in Fig. 6. Each operation is completely inspected before the block leaves the machine. Another important step is that of line reaming and final inspection of crank and camshaft holes following the final reaming operation.

The block then progresses through the line-up for the routine drilling and tapping operations, among which is a set-up on a three-way Ingersoll drilling machine with 60 spindles which drills simultaneously 29 holes in the top, 19 holes in the front end and

Fig. 7 (right)—Four-spindle Ingersoll honing machine finish honing cylinder bores. Note trunnion type fixture which swings each row of cylinders into position without removing the block. Tolerances on this operation 0.0005 in. for out-of-round and 0.0005 for taper

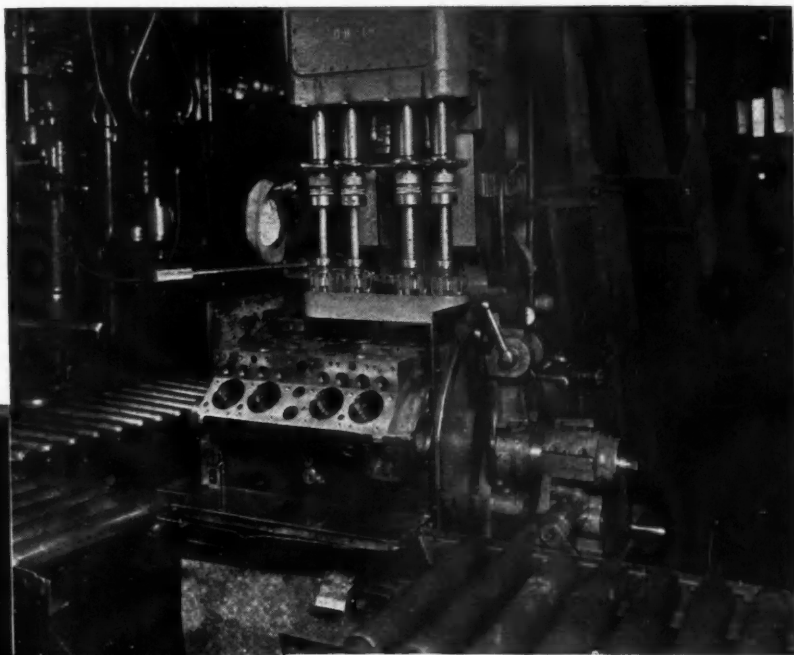
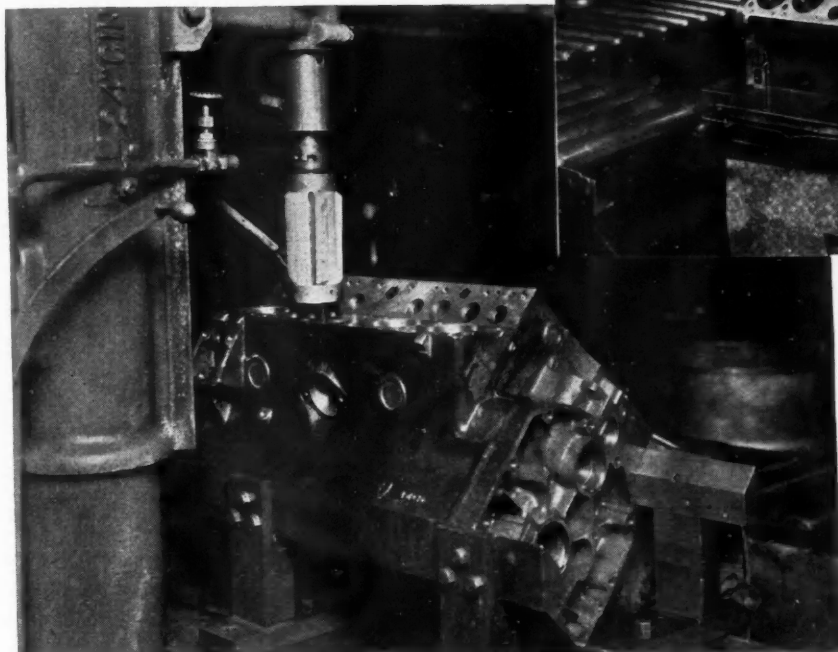


Fig. 8 (below)—Repair and finish honing operation on single spindle Cincinnati. Tolerances on this operation 0.0005 in. for out-of-round and 0.0005 for taper



of the ingenious design of the table and fixture. The view in Fig. 7 shows the Ingersoll four-spindle honing machine with the fixture partly open to disclose some of the detail. Note particularly the cylindrical type trunnion mounted table which permits the operator to index the two sets of cylinders successively in one setting of the fixture. The setting of the hones is checked by a master ring adjusted for a tolerance of 0.002 in. Moreover the final bore is checked by a
(Continued on page 770)

12 holes in the rear end. And, at proper intervals, as the block proceeds through the line-up, the odd single operations are segregated and shunted to special machines of high capacity. Another good example of this being a special drilling machine consisting of two six-spindle Bradford drill heads properly inclined to drill six-cylinder head bolt holes on each side of the block at $22\frac{1}{2}$ deg. to the vertical axis.

Multiple spindle tapping is accomplished wholesale on an Ingersoll three-way 58-spindle tapping machine which taps 31 holes in the top, 17 holes in the front end, and 10 holes in the rear end. This is supplemented by a special two-way Ingersoll machine which taps ten odd holes in the right side, and nine in the left side.

Valve guide bushings are pressed in on a two-way oil gear press after which they are size-reamed on a Leland-Gifford drill press. It is of interest to note that the camshaft bushings are pressed in on an oil gear broaching machine by means of a pulling bar and washers.

Another interesting detail is a station equipped with a Hannifin air press and an electric hand drill where a number of odd operations consisting of pressing-in the fuel pump rod guide bushing, five Welch plugs and the drilling of a water drain hole, have been grouped together into a high-production set-up.

Cylinder honing assumes unusual interest because

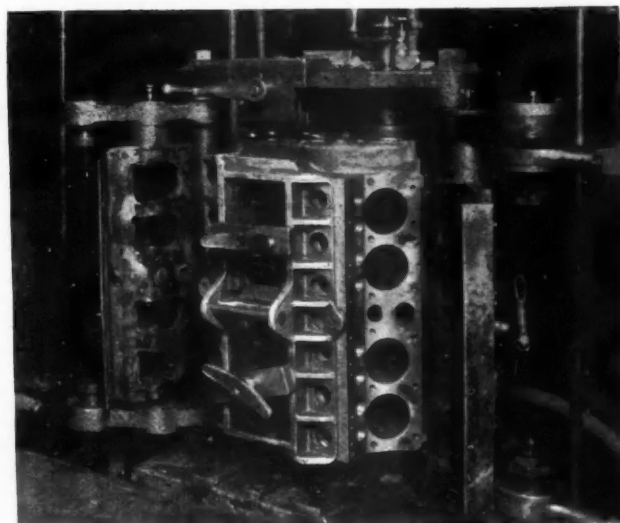


Fig. 9—Water testing machine with clamping leaves drawn back to show block in position. The block is tested in a vertical position, hot water being used at a pressure of 60 lb. per sq. in.

Renascence of Travel Abroad Linked



Nowhere in the world is highway improvement more important than in Latin America

THE proposed expenditure of over \$1,600,000,000 on roads by our state and local authorities during 1930 has a significance which need not be interpreted to the automotive world. The motorist knows that increasing the mileage of good roads means longer life and decreased upkeep for his car, as well as increased opportunities to travel in safety and comfort; the dealer and the manufacturer know that the call of the road rings clearest where the length of good road is greatest, that increasing the means of travel increases the desire to travel, and that every mile added to our system of surfaced roads means an increased demand for cars.

All the world's ancestors were nomads once, and Americans have no monopoly on the human instinct to travel. The only difference in that respect between us and our neighbors abroad is in our ability to gratify that instinct. That ability, insofar as automobile

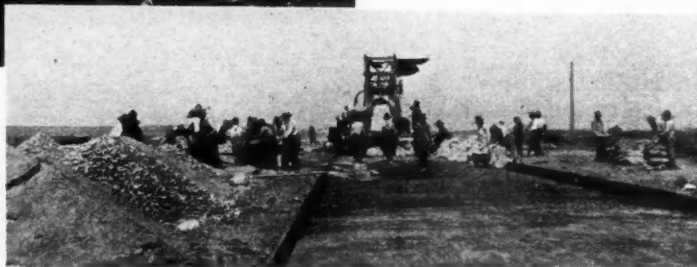
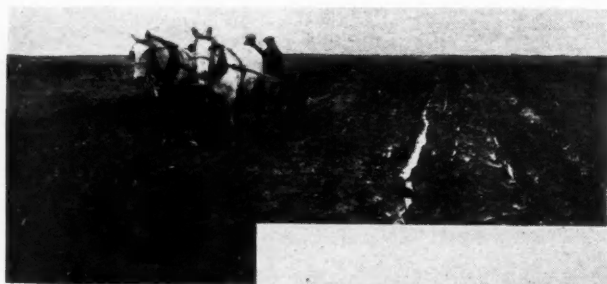
If automotive exports continue to increase, it will be largely because of bigger road-building programs in foreign countries * * *

travel is concerned, is due to a number of factors well enough known—the greater buying power of our population, the efficiency of our production methods, and many others, not the least of which is roads.

No other country in the world has so great a road mileage nor as many miles of hard-surfaced roads as there are in the United States. Although 17 European countries, Japan and New Zealand have a greater mileage of hard-surfaced roads in proportion to area than we have, none approaches this country in the "high type" surfaced roads. Unquestionably, the automobile brought this about, but it is equally true that unless the roads had been improved, our automotive industry would not have attained its present development, and if we are to see our automotive exports continue to increase it will be in large part because road improvement in foreign countries will have continued.

One of the most encouraging indications of what may be expected in world trade is the fact that in spite of other factors tending to depression abroad, expenditures on roads are increasing generally. In many countries programs extending over a period of years are being undertaken, thus guaranteeing a certain definite improvement annually in their transportation facilities, providing employment for road workers and transportation personnel, stimulating the trade in the necessities and luxuries these workers are enabled to purchase, and insuring the government of increased revenues from such sources as gasoline taxes, registration and license fees, etc. Other countries are finding that the necessity for increasing their road expenditures is becoming more pressing each year. No country in the world has a completed road system. Even in such countries as England and France, where road construction has been going on since Caesar's time, increased motor traffic is necessitating not only reconstruction, resurfacing and widening of existing roads, but construction of entirely new highways, and more money is being spent for road purposes than ever before.

A prominent English authority says that delays due to congestion, detours, etc., are costing British industry from 90 to 145 million dollars annually, and



Resurfacing and widening of existing roads, some laid out in Caesar's time, has been made necessary by increasing motor traffic

With Better Highways

By Dr. Julius Klein

Assistant Secretary of Commerce

that an expenditure of nearly 500 millions of dollars is needed to modernize British highways. This does not, of course, include the annual expenditure necessary to maintain the present system.

The amount to be spent in Great Britain during the fiscal year beginning April 1, 1930, on construction, improvement and maintenance under the present program will exceed 292 million dollars, an increase of 125 per cent over the fiscal year 1920-21, when it was slightly less than 130 million, and 310 per cent over the 71 million spent in 1910-11.

It is estimated that the road work now planned for the next five years in the United Kingdom will provide work equivalent to the employment of 100,000 men for one year.

Some of the projects included in the British program are on a really magnificent scale. The Mersey Tunnel at Liverpool is being constructed at a cost of 25 million dollars to facilitate motor traffic to and from Lancashire, North Wales, and the Midlands. The Great East Road, under construction at an estimated cost of 14½ million dollars, will permit speedier traffic of commercial and private motor vehicles between Liverpool and Manchester.



One of the most encouraging indications of what may be expected in world trade is the increasing expenditures for roads despite depressive factors

The automobile is doing its share toward these improvements, as is shown by the fact that revenues from users of motor vehicles amount to 70 per cent of the total annual road expenditure in the United Kingdom.



Dr. Klein and President Hoover at a recent informal meeting

In France, road expenditures of the national, departmental and local governments during 1929 amounted to 90 million dollars, an increase of nearly 18 million over

1928. The national budget alone for 1930 allots \$34,726,213 for national roads, an increase of nearly a million dollars over 1929. The budgets for departmental and local roads have not yet been published, but it is not likely that they will be smaller than last year.

Italy is carrying on a program of national highway improvement which calls for the expenditure of 80 million dollars before 1935, in addition to a yearly allotment of 10½ million for maintenance purposes. This does not include expenditures of the provincial governments, which amounted to over 20 million during 1928, nor those of local government, which are not of record.

Greece began late in 1928 the construction of 3000 miles of new roads and improvement of an equal mileage of existing roads at a total cost of nearly 30 million. Progress was slow at first, as the total expenditures on roads during that fiscal year, which ended March 31, 1929, were only \$2,400,000. During the following year the road builders hit their stride, and did 10½ million dollars' worth of work. If they continue their pace, even greater accomplishments may be expected for the present year.

Sweden has under consideration a road program involving the improvement of 1646 miles at a cost of 15 million dollars. The effect of motor traffic is clearly seen here, since it is estimated that over 11 million of the amount needed will be driven from automobile taxes.

During the last four years Spain has spent nearly 60 million dollars in repairing 1739 miles of highways under a program which calls for the expenditure eventually of over 102 million on 4349 miles of roads important for tourist traffic.

Finland will spend nearly \$2,600,000 on roads in 1930, and is considering a general highway plan which would cost over 34 million, and would require a foreign loan.

The Netherland Road Fund budget for 1930 as introduced in Parliament provides 10 million dollars, based on the road plan approved in 1927, which called for the expenditure of over 120 million in 25 years, of which 60 to 70 per cent would be spent on government roads and 30 to 40 per cent on provincial roads, with the expectation that the provinces would spend additional sums.

The Hungarian Government has instituted a large road-building program, and during the last four months has awarded contracts amounting to more than 8 million for new road construction and resurfacing.

Austria proposes to build a toll road across the Austrian Alps to provide a new connection between the provinces of Salzburg and Carinthia at an estimated cost of more than \$1,140,000. It will be the highest road in Austria—8250 ft. above sea level.

Road Construction an Investment

While road improvement, with its consequent quickening of trade, will and must continue to increase in regions like Europe, still greater developments may be expected eventually in the newer regions, such as South Africa, Australia and Latin-America, where there are still thinly populated areas awaiting development of vast potential resources, and where money spent on road construction and improvement is an even better investment. In some of these countries financing road work on a large scale is a problem, but they find that each mile of road built adds to their ability to finance more road construction.

During 1929 the Union of South Africa made available \$4,866,500 in the form of Union Aid to the four provinces for a national road-building scheme, the money to be used in the construction of trunk roads to link up the different provinces.

The road motor services operated by the Railway Administration in connection with the railways now cover more miles than the 10,000 miles of railways. This has done much to accelerate rural development.

Australia adopted a federal plan in 1926 whereby the commonwealth and state governments were to spend 175 million dollars in 10 years. The Main Roads Board of New South Wales alone spent over 58 million in 1929. Victoria spent over 10 million, of which about 75 per cent was for new road construction. Revision of certain portions of the law governing the Federal aid plan in order to permit more rapid progress in road improvement is being discussed, and may come about this year.

Canada's Program Significant

Canada spent nearly 58 million on roads in 1928, the latest year for which figures are available. The estimates for all the provinces for 1930 have not yet been reported, but those reported are significant. Saskatchewan plans to spend over 10 million; British Columbia, 8 million; Quebec, over 11 million; Manitoba, 4 million; Alberta, over 5 million; New Brunswick is considering the expenditure of 10 million during the next five years; Nova Scotia's construction program for the next 20 years will cost 90 million dollars.

Nowhere in the world is the improvement of highways more important than in Latin-America, nor more difficult than in some of the countries in that area. In spite of fiscal and engineering problems, the work of providing better highway transportation facilities is progressing on a greater scale each year. Cuba's

76 million dollar Central highway, which is to be completed this year; Mexico's five-year program, which calls for the expenditure of nearly 40 million by 1935, beginning with \$5,850,000 this year and increasing annually to \$9,750,000 in 1934; Uruguay's six-year program, to cost over 17 million, and legislation passed in Chile since early 1928, providing revenues amounting to over 48 million for highways and bridges, are merely indications of what may be expected in the other countries south of us.

Considering the world as a whole, road-building has hardly begun. Our own highway system has hardly approached its ultimate development, yet the total mileage for all other countries combined is far less, and in proportion to area, amounts to only one mile of road to 6.6 sq. mi., whereas ours is roughly one to one. No one can predict how great will be the effort to approach our standard, but it is safe to assume that during the next 10 years road construction and improvement will be a constantly increasing factor toward the betterment of economic conditions throughout the world. The automotive industry may pride itself on the part it has played in the renaissance of the highway, and the industry can go on with the knowledge that every additional effort to improve highway transportation in foreign countries will react not merely to its benefit, but to the welfare of all the people in those countries.

Oakland V-8 Production

(Continued from page 767)

Federal indicator gage adjusted to the same master ring.

A single spindle 24-in. Cincinnati drill, shown in Fig. 8, provides facilities for repairing after the honing operation and also serves as a finish-hone. An inspector stationed permanently between the two honing machines checks each honed bore with a Federal die indicator gage and stamps each cylinder with a 1/4-in. character indicating its size by the symbol.

Water testing is the final major operation in the machine shop line and although the water test fixture has become a standard piece of equipment in every cylinder block line, its design varies with the ingenuity and originality of the tool engineer. Fig. 9 shows the water test fixture developed for the Oakland line. Here the block is handled in a vertical position in a box fixture, having two hinged leaves. Water pressure is about 80 lb. per sq. in., which is the usual practice.

The entire machine shop line, including the final inspection of the finished cylinder block line after leaving the water test, consists of 70 separate stations, among which are included a number of repair operations. The thoroughness of the final inspection may be visualized from the fact that 33 separate inspection gages are used on each cylinder block at this station.

The perspective of the operations along the machine shop line throws into bold relief a careful planning based upon the most advanced production ideas in the automotive field. Obviously it is only by this harnessing of every advance in the production man's art that Oakland is enabled to build a high quality V-type eight-cylinder engine for a car of moderate price.

Oil-Fuel Equipment Now Provided for Climax Gasoline Engines

Rectifier, heat control mechanism and water supply fixture constitute features of new unit.

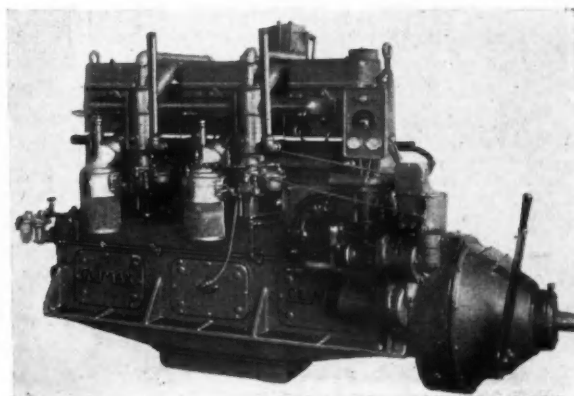
THE Climax Engineering Co. of Chicago, Ill., and Clinton, Iowa, announces that its line of Blue-Streak engines now can be provided with equipment making possible the use of fuel such as gas-oil having a density of 36 to 40 deg. Baume. Mean effective pressures of 90 lb. per sq. in. are obtained, and the power, flexibility and fuel consumption are said to compare favorably with those obtained from good gasoline-burning industrial engines of conventional design.

The equipment is the same as that employed on the gasoline-burning engine, with the addition of an oil rectifier, a heat-control mechanism and a water supply for full-load operation.

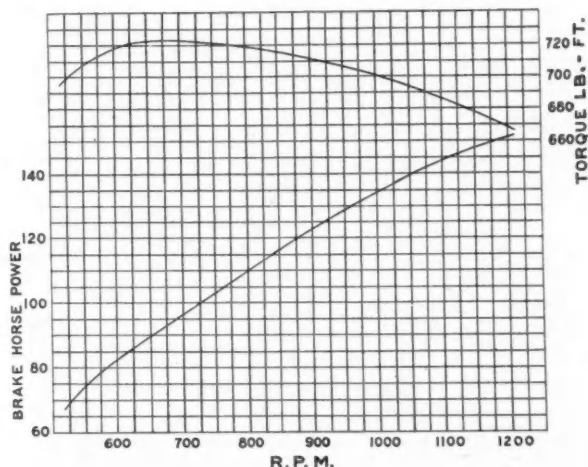
The oil rectifier reduces the dilution of the lubricating oil and is said to maintain it at the same point as in standard gasoline operation.

To provide the flexibility necessary for the successful handling of different loads and speeds encountered in various industrial applications, the heat supplied to the fuel mixture is varied automatically with the load.

The mechanism controlling this important function consists essentially of an aluminum body attached to the carburetor air horn, containing a syphon bellows, an air valve, water valve and air cleaner. Hot air is



Climax Blue-Streak engine equipped for operation on gas-oil



Torque and horsepower curves of Climax oil-burning engines

supplied to this mechanism through a flexible conduit connected to an air box built around the exhaust manifold.

Unheated air is admitted to the mechanism body through the Air-Maze cleaner shown in the illustration. Air-Maze cleaners are also attached to the openings on the hot-air box, so as to protect the induction and manifold system from dirt.

The syphon is connected to the intake manifold by a copper tube, so that pressure changes due to variation in loads on the engine are transmitted to the syphon, thus providing a motive power to operate a valve controlling the supply of heated or unheated air. This part is similar to the spark control mechanism used on Climax engines during the past two years, and is, therefore, a device which has been subjected to considerable field service and experience.

When the demand for power exceeds three-quarter full-load, the movement of the syphon opens a valve controlling the supply of water to the fuel mixture. The valve body may be seen mounted on the elbow connecting the hot-air conduit with the main body proper.

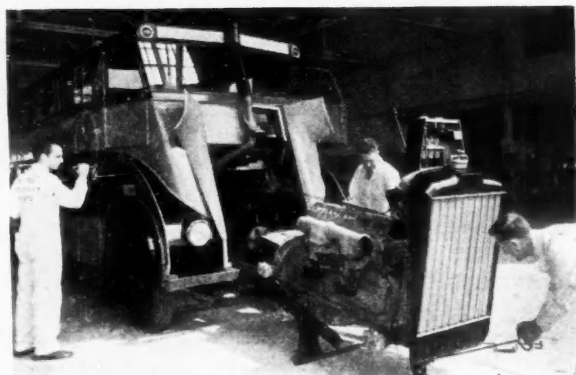
The water supply is furnished by a conventional diaphragm fuel pump mounted on and driven by the engine.

Gasoline is used for starting and until the engine is warmed up, and then the gasoline supply is cut off and fuel oil admitted, no other operation being required. On single carburetor engines one heat control device is used; the engine shown in the illustration has two carburetors, and dual equipment is provided, so that one design may be universally employed.

Pickwick Develops Duplex Bus

Coach, powered by a six-cylinder 150-hp. Sterling engine, designed to carry 53 passengers. Seating compartments, accommodating four persons, have unique arrangement.

A FIFTY-THREE-PASSENGER bus of double-deck type has been brought out by the Pickwick Corp. of Los Angeles, Calif. The outstanding feature of the new design is the efficient utilization of body space, seating accommodation being provided for 53 passengers on a coach of 246-in. wheelbase and 33 ft. overall length. The Duplex (as the new model is called) is built on the interlocking-compartment plan and is designed specially for intercity service, for which single-deck buses have been used practically exclusively in the past. A center aisle runs from the forward end more than halfway to the rear of the coach. Single steps lead up and down into the four-place compartments. Seats are made of pressed dura-



Showing how the 150 hp. powerplant can be removed from the Duplex coach for replacement

lumin; they are adjustable and deeply upholstered. The coach has wide sliding windows of shatter-proof glass.

The Duplex coach is equipped with a six-cylinder 150 hp. Sterling engine which weighs about 1800 lb. It is claimed that this engine may be removed and a complete new powerplant installed in 20 min. The hood opens on hinges and the engine can be removed after four bolts have been loosened and the water, gas and electric lines disconnected. All of the connections of these lines are arranged in a single assembly, so that only one additional bolt needs to be loosened. A portable folding steel track is the only extra equipment required.

The weight of the bus, unloaded, is 17,000 lb., of which the front tires carry 7500 and the rear tires 9500 lb. Fully loaded the bus weighs 25,000 lb., of which the front tires carry 9000 and the rear tires 16,000 lb. Tire equipment consists of 40 by 10.5-in. balloon tires on 20-in. rims.

The engine compartment is located under the driver's compartment and access to it can be had by opening the hinged hood in front or removing the floor of the driver's compartment. All such engine accessories as the storage battery, reserve oil tank, etc., are located in this compartment. Special lights are furnished with which the engine compartment can be illuminated at night, and ample ventilation is assured by louvers on both sides.

The body is an all-metal construction and comprises sills of 7-in. pressed steel channel sections extending the entire length of the body and being tied together by 14 cross-members. Pressed steel pillars are connected to the sills at the bottom and duralumin carlings at the roof, these carlings joining the sides of the body at each pillar. Free additional channel bars extend the whole length of the coach, below and above the windows respectively. In connection with these, two sets of duralumin body panels are used, forming the inside and outside walls respectively. All partition walls, braces, etc., are fastened to the inside sheet, insulation being placed between the inside and outside wall sheets. This double-sheet wall construction is used throughout. Extra steel channels are carried over the door openings to further reinforce the construction. All floors are made of heavy duralumin plate, reinforced with angles and channels, well insulated and covered with linoleum or rubber flooring.

The central aisle section is raised above the lower floor and is made of 1/8-in. duralumin plate extending the whole length between the engine compartment and the rear wheel housing, this, together with the lower floor, making two additional stiffening members in the center of the coach. Uprights extend from the aisle to the roof at certain intervals. These, together with the compartment cross partitions and braces, produce a type of honeycomb construction for which unusual rigidity is claimed. The roof is composed of an insulating board covered with painted canvas which is securely riveted to the duralumin cross channels.

Raised Aisle Between Sections

The aisle is raised above the lower floor a height equal to one-third that of the upper floor, and extends the entire length of the coach; it is 20 in. wide and has a maximum head room of 85 in., while over the rear baggage compartment the head room is 72 in. The propeller shafts and other connections to the rear axle are located under the center aisle.

As already pointed out, seating accommodation is provided for 53 passengers, all being seated on individual reclining chairs, with the exception of five occupying the rear lounge, two occupying "observation seats" in the driver's compartment and two occupying folding seats in the vestibule. There are only 18 seats on the lower floor, making about two-thirds of the total number upper level seats, which previous experi-

for Intercity Service

ence with this general type of coach has shown to be in greatest demand. Sixteen of the seats face toward the rear, so that more than two-thirds of the total number of seats face in the direction of travel.

Seats of a special reclining type are fitted, developed by the engineering department of the Pickwick Corp., with a positive silent release mechanism. These seats are of all-metal construction, finished in lacquer and upholstered in mohair over deep cushion springs.

A vestibule is provided at the right side in front, immediately behind the front wheels. It has a floor space of 26 by 36 in. and contains a folding seat for use when all interior seats are occupied. An outside door, 26 in. wide by 68 in. high, affords entrance and exit facilities, and is controlled from the driver's compartment by means of an air engine.

Two Baggage Compartments

The baggage compartment is located behind the rear axle, 20 in. above ground level, and has a capacity of 284 cu. ft. Wide doors on each side, 30 in. wide by 40 in. high, permit of carrying several trunks. In addition to this main baggage compartment, there is an interior baggage compartment of 14 cu. ft. capacity on each side in the center of the coach.

The driver's compartment is located directly over the front wheels and the engine, its floor being 60 in. above the ground. At the front of this compartment there is a V-shaped windshield, in two parts, with narrow corner posts. On each side of the compartment there is a sliding glass window.

Two 50-gal. fuel tanks are located on opposite sides between the front and rear lower compartments. These tanks are easily filled from the outside and are equipped with electric gages. Heavy insulation is placed

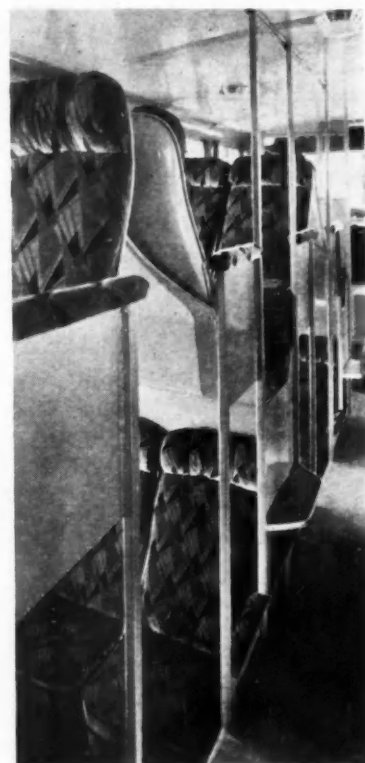
between these tanks and the walls of the coach for safety.

All electric wiring is carried through the channels and pillars of the body, junction boxes located at convenient points making it possible to replace any of the wiring if this should become necessary.

The muffler is located in a rather unusual position, over the right front wheel housing, and is connected to the engine by a Pickwick exhaust clamp of patented design. The tail pipe from this muffler is carried up centrally at the front of the car to about 2 in. above the roof. This arrangement has proved effective not only in keeping exhaust gases out of the coach but also in reducing maintenance costs, as compared with the usual practice of carrying exhaust pipes underneath the entire length of the coach.

Twelve individual hot water radiators are distributed over the upper and lower compartments, on the outside walls. Water from the engine cooling system is forced from the top of the engine along the exhaust pipe into these radiators, and returns from them to the pump.

All metal parts are primed and baked in an oven before assembly.



Seating plan of Duplex coach. Note staggered arrangement of sections

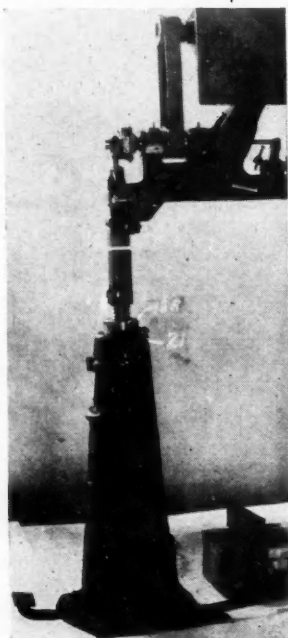


New 53-passenger Pickwick Duplex day coach

NEW DEVELOPMENTS—AUTOMOTIVE

Pedestal and Post Type "Quickwork" Power Hammer

SHEET metal aeroplane parts, deep drawn stampings and similar shapes can be drawn and polished on "Quickwork" Power Hammers with the pedestal type lower die support recently



introduced by The Quickwork Company, St. Marys, Ohio, without interference or limitation by the lower bracket. Because of the construction of the lower die support of both the pedestal type and post type the lower die can be very quickly adjusted upward or downward in relation to the upper die, it being only necessary to loosen the large jam nut at the lower end of the anvil screw and turn it up or down.

The anvil screw on which the die is mounted is so keyed that it cannot turn with the sleeve, thus

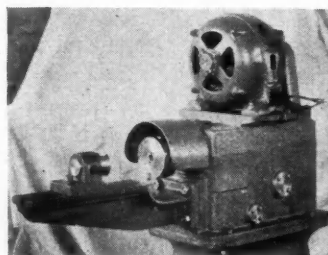
giving the strongest possible resistance blow at the same time permitting quick adjustment. These hammers are so constructed that the force of the blow can be increased or decreased in direct proportion to pressure exerted by the operator's foot on the foot pedal without changing the number of blows struck per minute.

As illustrated, a bracket can be supplied on which is mounted a motor of 2 hp. for the larger size, and 1½ hp. for the smaller size, of any speed or current characteristics. These power hammers are made in two sizes, one heavy and one light, the larger size weighing 900 lb., the smaller size weighing 750 lb.

Kent 1 in. Bolt and Stud Pointer

A NEW machine for pointing bolts, studs and rods up to one in. diameter has been placed on the market by the Kent Machine Company, Cuyahoga Falls, Ohio. While this machine is designed especially for pointing, it can be adapted to end drilling, shouldering, hollow

milling, etc. This pointer is semi-automatic in its action, with the pointing head moving forward and back a predetermined number of times per minute. It is built in two



types; one type with an arrangement for holding the bolt by the head while the other is provided with a double

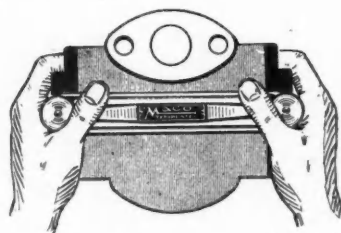
jaw gripping attachment, for round head bolts, studs or rods.

The pointing head spindle is driven by silent chain in the motor driven machines and by a pulley on the spindle from a countershaft when the machine is furnished in belt drive. The reciprocating action of the cutter head is obtained by a cam which is driven through gearing from the cutter spindle, all of this gearing and cam mechanism being contained within the body of the machine. Outside of the body is a set of change gears by means of which the number of reciprocations of the cutter head may be controlled. Gears for obtaining 25 to 60 points per minute are furnished with the machine and other gears may be secured for fewer or greater reciprocations if conditions warrant these extremes.

American Maco Laminated Template

DRRAFTING, inspection and toolmaking departments will be interested in the new method of male or female profile transference provided by the Maco template recently introduced by the American Maco Template Co., Inc., 44

Whitehall Street, New York. It is composed of a large number of fine vertical strips of hard drawn brass, 0.007 in. thick. These laminations are held in position by two



clamps fitted with sections of corrugated rubber which prevent the laminae from falling out.

When an exact template of any profile is required, all that is necessary is to loosen the screws and press the adjustable template against the contour. As a result the laminae take a perfect outline of the surface against which they are pressed, their extreme thinness materially

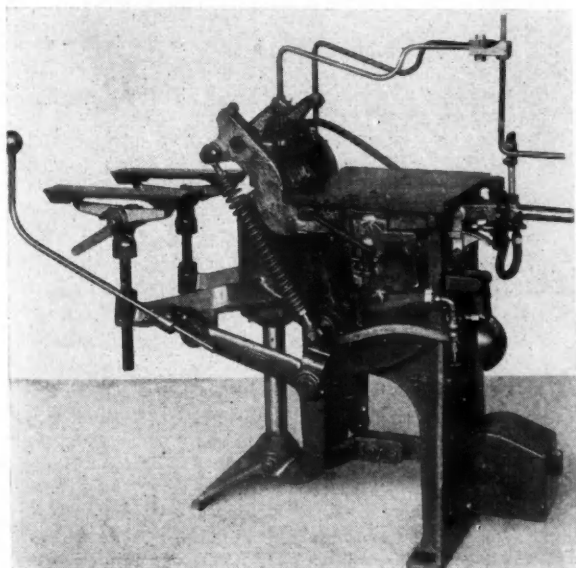
PARTS, ACCESSORIES AND PRODUCTION TOOLS

assisting in the facility and precision of the process. When the pressure is complete, by merely locking the screws, the laminae are held in position.

Tabor Hand Roll-over Molding Machine

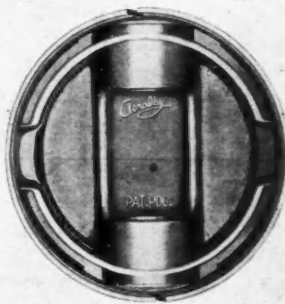
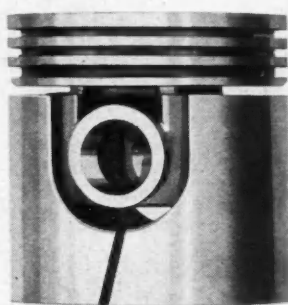
AVAILABLE in either hand or jar ramming types, the small Tabor hand roll-over molding machine was shown for the first time at the American Foundrymen's Association Convention in Cleveland by the Tabor Manufacturing Company, Philadelphia, Pa. Its outstanding feature is a patented application of ball bearings in the main pattern drawing guide, which is said to eliminate trouble and wear due to sand and dust. All other bearings are fitted with alloy bronze bushings which require no lubrication and are readily renewable. The roll-over frame is of steel; it is provided with adjustable stops and is disengaged from the jarring machine during the jarring operation.

The jarring valve is knee operated and the vibrator is so located on the roll-over frame as to be conveniently controlled by the operator with the same hand used in rolling over the frame. The jarring machine illustrated here has a 3 in. diameter piston 10 in. long. The extreme length of this piston in proportion to its diameter not only insures a hard ramming blow but is said to increase its life. The adjustments in changing from one job to another are all accomplished by hand.



Toledo Castings Co. Offers Aeraloy Piston

A NEW aluminum-alloy piston, called the "Aeraloy," is being offered for original equipment by the Toledo Alloyed Castings Co., Toledo, Ohio. In this design of skirt expansion due to heat is neutralized by contraction of the skirt halves. The piston is claimed to be exceptionally well



adapted to modern production methods. Its feature in this respect being the use of a metal core in diecasting. As will be noted from the illustrations, the piston skirt in the fully machined condition is fully separated from the head proper, being connected to the pin bosses by internal circular supports, the points of attachment to bosses and skirt being approximately 90 deg. apart.

These inner supports are cast as a unit with the piston proper and are later cut away from the head in the same operation that separates the skirt proper from the head, the only requirement being the use of a deeper cutter. Other manufacturing advantages are said to include the absence of undercuts.

The control of piston expansion is explained in the following manner: As the head expands, the bosses, of course, will also expand outward. This tends to pull the sides of the piston in toward the center, through the action of the circular supports, neutralizing the skirt expansion due to heat. The effect on the skirt is to decrease the width of the skirt slots below the pin bosses. Since the only skirt bracing is through the aforementioned circular supports, the skirt is quite flexible, especially near the split, so that it can readily adapt itself to required changes in curvature as a result of expansion.

The factory claims that the pistons can be fitted with a clearance of one to two-thousandths without any material danger of scoring or freezing.

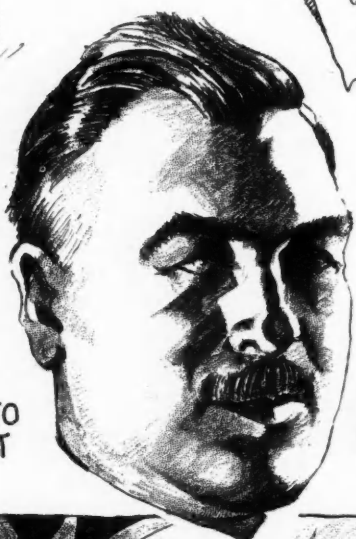
Automotive Oddities

by Pete Keenan

A GERMAN BUS COMPANY
IS TRYING OUT THIS
NEW TYPE OF FENDER
TO PICK HOLES IN TRAFFIC.



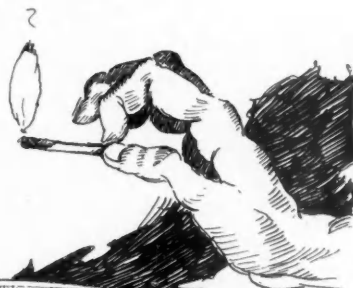
WM. E. METZGER
WAS THE FIRST AUTO
DEALER IN DETROIT



NEWS SECT

The sight of a well-loaded
carriage moving along the streets
at a spanking pace with no horses
in front and apparently with no-
thing on board to give it motion,
was a sight that has been too
much, even for the wide-awake
Chicagoan.

AN ITEM
FROM A
CHICAGO PAPER
Sept. 1892.



YOU CAN
EXTINGUISH
A MATCH BY
DIPPING IT IN
GASOLINE.

(But Dont Try it)



"THE EARLY GLIDER"

800 Years ago the Sultan
of Turkey, the Emperor of
Rome, and the populace
assembled at the Hippodrome in Constantinople,
to watch a Saracen glide from a high building on
linen wings. The poor fellow crashed and was
instantly killed, much to their amusement.

First with
the News

Reliable,
Accurate

News of the Industry

PAGE 777

VOLUME 62

Philadelphia, Saturday, May 17, 1930

NUMBER 20

Aero Traffic Code Proposed by Short

Would Promote Safe Flying,
He Says, at Buffalo
Conference

BUFFALO, May 15—Adoption of a standard uniform code by the Federal government for handling traffic in and out of airports was strongly advocated by C. W. Short, Jr., manager of Municipal Airport, Tulsa, Okla., in an address which was the high light of the first day's session of the Second National Airport Conference of the Aeronautical Chamber of Commerce of America, held here.

"This would be a tremendous step in the promotion of safe flying," said Mr. Short. "Federal control would be the most simple expediency. State regulation would be satisfactory, providing all of the states agreed to adopt the same code of traffic rules, but this would probably take years to accomplish."

Major John Berry, manager of Cleveland airport, advocated adoption of uniform lighting code. Frank L. Bergschler, airport director of Beaumont, Tex., advocated rapid developments on small town landing field, pointing out that this is one of the greatest factors in developing private use of planes. One hundred and fifty attended the conference. Other speakers were Captain Frank Haws, Sir Hubert Wilkins, Julien E. Eysmans of the Pennsylvania Railroad. Several management problems were discussed in committee.

Fairchild Reports Sales

NEW YORK, May 15—The annual report of Fairchild Aviation Corp., manufacturing division of the Aviation Corp., mailed to stockholders today by Sherman M. Fairchild, chairman of the board of directors, shows sales for 1929 of \$3,494,356.60 compared with \$2,656,560.12 for the previous year, an increase of \$837,796.48 or more than 31 per cent. Inventories as of Dec. 31, 1929, are shown as \$1,151,386.03 after providing liberal reserves for possible losses due to obsolescence, unsalable parts or material, etc. Investments were given as \$1,557,386, including 210,000 shares of the Aviation Corp. valued on the books at \$1,110,000, or approximately \$5.29 per share.

New York Has Most Licensed Airplanes

WASHINGTON, May 13—A study just completed by the aeronautics branch of the Department of Commerce shows that California and New York lead the nation in the number of licensed pilots, planes and mechanics. California stands first on the list of licensed pilots and mechanics with 2244 and 1582 respectively, while New York heads the list of licensed airplanes with 984.

General Motors Sales to Consumers Increase

NEW YORK, May 15—During the month of April, General Motors' dealers in the United States delivered to consumers 142,004 cars, according to an announcement made today by Alfred P. Sloan, president, General Motors Corp. This compares with 123,781 cars for the month of March and with 173,201 cars for the month of April, 1929.

Sales to General Motors dealers in the United States amounted to 132,365 units as compared with 118,081 in March and 176,634 in April, 1929.

Total sales to dealers including Canadian sales were 150,661 as compared with 135,930 in March and 227,718 in April, 1929.

Wilcox-Eaton Merger Assured

DETROIT, May 14—Sufficient stock in the Wilcox-Rich Corp. has been deposited to insure completion of the merger with the Eaton Axle & Spring Co. of Cleveland, it was learned here yesterday. Under rules of the New York stock exchange, thirty days must elapse before such a merger can be completed and this period ends May 22.

G.M. Offer to Purchase Winton

NEW YORK, May 15—General Motors Corp. has made an offer to the Winton Engine Co., Cleveland, Ohio, to purchase all of its assets and property of any description for which the General Motor Corp. will pay 126,667 shares of common stock. This is equivalent to 1 1/3 shares of General Motors stock for each share of Winton which would be deposited in the event that the sale is approved.

Car Sales Better, Reeves Tells Group

Summer Weather Has Usual
Effect on Automobile
Markets is View

HARTFORD, CONN., May 15—"Sales reports from most parts of the country indicate improved motor markets with consequent general business gains," Alfred Reeves, general manager of the National Automobile Chamber of Commerce, stated in his address today before the automotive division of the Hartford, Conn., Chamber of Commerce.

"After a pretty flat winter, summer weather is having its usual beneficial effects on this industry. April business was slightly above 1929, and May sales reports are promising. The improvement is spotty with markets opening up in the larger cities.

"The chief worry of the motor industry is not the question of general business conditions, but rather the growing tendency to harass the motorist. Busy-bodies, reformers, bureaucrats, everyone with an axe to grind or an experiment to foster, tries to take it out on the motorist.

"We have every sympathy with public records which aim to stop recklessness, but there is too much paper work and too little real examination with respect to getting licenses."

Peerless Shipments Gain

CLEVELAND, May 15—Peerless Motor Car Co. shipped approximately 700 cars in April, compared with 1778 shipped in April last year, which constituted a new high record for the company. Shipments, however, during spring of 1929 were principally in the lower price range, whereas shipments at present are of larger and more expensive models, lower priced line having been discontinued.

United Seeks Listing

NEW YORK, May 15—United Aircraft & Transport Corp. has applied to New York Stock Exchange for listing of 40,000 additional shares of common stock on notice of issuance and sale, and of 181,567 additional common shares in exchange for shares of National Air Transport, Inc.

Marmon Announces New Guarantee Policy Covering First 12,000 Miles of Car Operation

INDIANAPOLIS, May 17—After four years of concentration on the straight-eight type of motor car, the Marmon Motor Car Company announces a factory guarantee of one year or not to exceed 12,000 miles of driving, whichever shall first occur, on each of the four models which comprise the 1930 Marmon line of straight-eights.

The new guarantee, which is described in a statement by G. M. Williams, Marmon president, replaces the standard factory ninety-day warranty and is effective immediately, being extended also to all owners who have purchased 1930 Marmon cars since May 1 of this year.

In principle, the guarantee covers to the original purchaser all material and workmanship in much the same manner as the ninety-day warranty except that the period of time is one year from date

of purchase of the car or is limited to 12,000 miles of actual driving provided this mileage figure is reached before the expiration of the twelve months period.

The models covered by this guarantee, all of which are straight-eights, are the Marmon-Roosevelt, Marmon Eight-69, Marmon Eight-79 and Marmon Big Eight. In price, these models cover four price classifications from \$1,000 upward.

A provision of the new Marmon warranty is that the car will be registered at an authorized Marmon service station each thirty days during the period the guarantee is still in force. The owner thus may be advised of the condition of his car and the factory, through the distributor or dealer, may have regular knowledge of the condition of the car which it has guaranteed against defective material and workmanship.

Chrysler "77" Reduced; New Model is Expected

DETROIT, May 12—Price reductions ranging from \$200 to \$350 on the closed models of the "77" line were announced today by the Chrysler Sales Corp. The price cuts, which are effective immediately, have been made to clear the way for a new model to replace the Chrysler "77" in mid-summer, according to the announcement. Prices on the Chrysler Imperial, "70," "66" and the new low-priced Chrysler Six lines will remain unchanged, it was said.

Old and new prices on the six models affected by the reduction follow:

	Old Prices	New Prices	De- crease
Town sedan	\$1,795	\$1,445	\$350
Royal coupe	1,725	1,495	230
Business coupe ..	1,625	1,395	230
Royal sedan	1,725	1,495	230
Crown coupe	1,795	1,575	220
Crown sedan	1,795	1,595	200

Rubber Tapping Controlled

WASHINGTON, May 15—Approximately 91 per cent of the Netherlands and 90 per cent of the British rubber group have approved of the May tapping cessation scheme so that its inauguration is assured, according to a report received from Acting Commercial Attache Paul S. Guinn, The Hague. The Asiatic growers in Malaya to the extent of 75,000 tons also are reported to have agreed.

The Netherlands group includes the associated German, French, Belgian and Swiss growers as well as around 5000 tons of government estate rubber. The report added that the Dutch are taking steps to see that tapping in May and June does not go above normal.

Advertising Men to Meet

NEW YORK, May 13—The advertising managers of the members of the National Automobile Chamber of Commerce will meet in Toledo May 19 and

20 to discuss some of their common problems. Among the items to be discussed are the relative efficiency of various media for reaching the local market, and discriminatory rates levied against automotive copy.

August C. Fruehauf

DETROIT, May 12—August C. Fruehauf, chairman of the board of the Fruehauf Trailer Co., died yesterday morning at his home in Grosse Point Park, after an illness extending since last December. Mr. Fruehauf, who was 62 years old, was a blacksmith and horseshoer in Detroit until 1916 when he evolved the trailer and formed the company bearing his name. He leaves four sons, Andrew, Harvey, Harry and Roy; one daughter, Mrs. Myrtle Chamberlain; two brothers, George and L. J., and one sister, Amelia Hoffman. Mrs. Fruehauf died four years ago.

General Motors Holders Plan Special Meeting

Creation of Special Stock Issue on Program

NEW YORK, May 14—General Motors Corp. has issued a notice for a special meeting of the stockholders of the corporation to be held May 26 in Wilmington, Del., at which time an amendment to the certificate of incorporation, involving changes in the power of the board of directors in the issuing of stock will be considered.

The creation of an issue of 6,000,000 shares of preferred stock of no par value, for the retirement of other senior securities, provision for the addition of preferred stock of other series, and authorization for the board to act upon any contract for the underwriting of these stock issue are among the changes in the fourth article of the certificate of incorporation which will be voted upon at the meeting.

Goodyear Plant at Peak

GADSDEN, ALA., May 12—The one millionth tire was turned out on May 6 at the Gadsden, Ala., plant of the Goodyear Tire & Rubber Company, less than a year after the plant began operations. The first tire completed in the plant was on June 21, 1929. Ground for the plant was broken on Feb. 6, 1929, and the factory began operations less than six months later. Daily production is now approximately 6000 tires daily with more than 1000 men employed.

Muskegon Approves Issue

DETROIT, May 12—Stockholders of Muskegon Motor Specialties Co. today approved the proposed increase in the capitalization of the company to 500,000 shares from 125,000 shares to provide for the acquisition of the Jackson Motor Shaft Co. The exchange of stock will be consummated on a share for share basis.

Rubber Invoiced to U. S.

WASHINGTON, May 17—American consular offices at Singapore, Penang, Colombo, Batavia, Surabaya, Medan, London and Liverpool, whose vise invoices on all rubber shipped to the United States from Malaya, Ceylon, Netherland East Indies, and the United Kingdom, report by cable the following amounts of rubber invoiced during the week ended May 10 as compared to amounts invoiced in 10 preceding weeks.

1930	Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	TOTAL
March 1		8,146	2,315	2,898	57	13,416
March 8		6,637	925	1,990	45	9,597
March 15		6,256	658	1,786	10	8,710
March 22		7,075	753	1,997	19	9,844
March 29		5,867	1,335	1,462	Nil	8,664
April 5		7,435	779	2,109	Nil	10,323
April 12		7,026	1,235	1,527	7	9,795
April 19		6,013	493	1,109	21	7,636
April 26		5,558	642	1,224	Nil	7,424
May 3		7,703	1,384	1,806	25	10,918
May 10		6,863	891	1,271	11	9,036

All figures in long tons.

Copper Rise Features Metal Market Situation

Black Sheet Quotations Lower Under Pressure

NEW YORK, May 15—The rebound of copper, which after having dipped to as low as 12¼c last week, was quoted at 13c at the opening of this week, acted as a tonic on the metal markets generally. While the rally in the copper market resulted primarily from improved export demand, domestic consumers bought good-sized tonnages at 12¾ @ 13c, the ½ @ ¾c advance being expressive of healthy reaction from the previous doldrum state of the market under the stimulus of genuine consuming demand.

In the steel market more attention was paid to the reassuring pronouncements of the leaders of the industry on the occasion of the American Iron and Steel Institute's annual meeting than to the decrease of 216,433 tons in the leading interest's unfilled tonnage statement published on Saturday. The decrease was generally interpreted as normal for the Corporation's April backlog, the increase shown on the corresponding date of last year having been out of line with precedent. With the rate of demand and mill operations having undergone so far little change, price conditions for many finished steel descriptions remain, however, more or less ragged.

Continuing intensive competition in the Detroit market causes black sheets to be quoted more generally at 2.55c, Pittsburgh, as compared with 2.65c, the quotation formerly in vogue. Full finished automobile sheets are fairly firm at 3.80c. Cold rolled strip steel may also be quoted at 2.55c, Pittsburgh, rather than the 2.65c level named a month ago. All of these soft spots, however, are looked upon by producers as the prelude to a gradual all around steady-ing of the market.

Pig Iron—Recent price reductions in Middle West markets, amounting to 50 cents per ton, have cleared the atmosphere, and sales in Cleveland and Chicago have broadened, although automotive foundries continue to be very cautious in their commitments.

Aluminum—The movement of virgin aluminum into consumption in April was slightly better than that noted during the preceding month, and indications are that the gain is being maintained in May. Heavy accumulations of scrap have caused prices for secondary No. 12 to give way to the extent of ¼ @ ½ cents per pound.

Copper—Quotations for copper and brass products, based on a 12½ cents copper price, have been withdrawn by the leading fabricating interest, and superseded by prices in keeping with the advance of the market recorded early this week.

Tin—Under the influence of the upward turn in the copper market, the price of Straits tin rose about ¾ cent at the opening of the week to 32½ cents, a more firm tone characterizing both trading here and in London.

Lead—The market has become firmer, London quotations having scored sharp advances. Much of the business being received is for rush shipment, consumers having played very close to the cushion in recent weeks.

Zinc—Improved demand and a more steady tone are noted.

Automobile and Parts Manufacturers Have Strengthened Financial Structure in 10 Years

CHICAGO, May 12—Both automobile manufacturers and parts and accessories makers show many marked similarities in their financial structure, according to a survey made by the bureau of business research of the University of Illinois. During a period of the past 10 years there was a distinct tendency for both of these groups to strengthen their financial structures, the survey shows.

For both groups, a study of the balance sheet structures shows that there was a steady reduction of working assets in proportion to fixed plant investment, implying more efficient usage of working assets.

For each dollar of total capital invested in automobile companies in 1920, 70 cents were in working assets and 24 cents in fixed assets, the researchists find, by 1926, working assets per dollar of total capital declined to 56 cents and fixed assets increased to 35 cents.

Similar changes also occurred in parts and accessory companies, although to a smaller degree.

The decreases in current assets were attributable primarily to reductions of inventories, which declined from 44 cents in 1920 to 28 cents in 1926 per dollar of automobile capital.

Parts and accessory companies reduced their proportionate investment in inventory from 35 cents in 1920 to 19 cents in 1926 per dollar of total capital.

Although the proportions of capital invested in cash and receivables of the parts and accessory firms remained practically the same—three cents for the former and nine cents for the latter—for 1920 and 1926, the cash of motor car manufacturers increased from .05 to .08 of total assets, while receivables declined .07 to .04.

The most interesting change in assets, however, it is found, took place in the holdings of cash reserves in marketable securities. Of the automobile companies with such securities in 1920, 78 per

cent had less than .10 of their total resources thus invested. By 1926 this had declined to 61 per cent and by 1928 only 31 per cent of the companies had less than .10 of their total resources thus invested.

Thirty-eight per cent of the companies had more than 20 cents out of each dollar invested in marketable securities in 1926, compared with none over 20 cents in 1920. Changes in marketable investments of parts and accessory firms were similar, although not so pronounced.

Interesting changes are reported in capitalization and liabilities. Capital obtained from current creditors of automobile companies declined from .25 to .11 of the total assets from 1920 to 1926; this was offset by increased borrowing of capital by means of bonds and preferred stocks, which were .16 and .19 of the total assets in 1920 and 1926, respectively.

Parts and accessory companies decreased both short term and long term borrowed capital. The former declined from .09 to .08 and the latter from .33 to .24 of the total assets from 1920 to 1926.

Financial plans, it is seen, were strengthened by increases in common stock equities. Automobile common stock equities increased from .53 to .58 of total assets from 1920 to 1926, while parts and accessory companies increased the common stock equity from .43 to .60.

These figures, the survey concludes, which are typical averages based upon numerous cases, are well suited for comparative use in the analysis of individual financial statements.

With the aid of charts showing the distribution of financial ratios of numerous other companies, together with the average, the individual company's financial position may be analyzed in contrast with the entire distribution of the cases, as well as with the typical averages.

Garage Tax Appealed

CHICAGO, May 12—Appeal to the Supreme Court of Illinois has been made from the decree entered by Judge Hugo Friend dissolving the temporary injunction restraining the City of Chicago from enforcing the Private Garage License Ordinance. By this ordinance the city is empowered to levy a license fee on private garages storing five or more motor vehicles. The case will probably be heard at the May term of the Supreme Court in Springfield.

Met. Section Elects

NEW YORK, May 12—Metropolitan Section, Society of Automotive Engineers, has elected the following officers for the 1930-31 season: Chairman, Austin M. Wolf; vice-chairman, John F. Creamer, Wheels, Inc.; vice-chairman for aeronautics, Charles Froesch,

Walker Aircraft Corp. of America; treasurer, Erwin H. Hamilton, New York University, and secretary, Grosvenor Hotchkiss, Western Union Telegraph Co. These officers will officiate at the first fall meeting in September.

Crossland Has New Plane

CHICAGO, May 12—Crossland Ace is the new winged craft designed and built by the Crossland Aviation Systems, Inc., 3514-20 South Michigan avenue. This is a three-place, cabin-type monoplane with a dual "dep" control.

This airplane has been flown successfully eight different times, and preparation is now being made to go into production of this type, as well as a six-place cabin-monoplane. It is also understood that a single place low-winged monoplane is to be produced.

March Tire Production Exceeds February Output

5,187,970 Casings and 5,270,560
Tubes Were Made

NEW YORK, May 14—Tire production for March is estimated by the Rubber Manufacturers Association at 5,187,970 casings and 5,270,560 inner tubes, being in both cases increases over the previous month, but falling below production figures for the corresponding month of last year. These figures are based on reports of members who produce approximately 75 per cent of the total United States output, and have been adjusted to 100 per cent. Inventories are also above February but below March of last year indicating an adjustment on the part of manufacturers to meet current conditions. Comparative figures follow:

Pneumatic Casings For the Industry				
	Production	Shipments	Inventories	
Mar. 1930....	5,187,970	5,031,820	13,468,970	
Feb. 1930....	4,859,475	4,474,459	13,238,451	
Mar. 1929....	7,519,234	6,708,134	16,351,750	

Inner Tubes For the Industry				
	Production	Shipments	Inventories	
Mar. 1930....	5,270,560	5,042,385	14,057,360	
Feb. 1930....	4,942,755	4,626,559	13,905,291	
Mar. 1929....	7,466,356	7,466,382	17,750,180	

Balloons Casings Members only				
	Production	Shipments	Inventories	
Mar. 1930....	3,311,978	3,177,634	7,535,468	
Feb. 1930....	2,975,922	2,750,324	7,436,247	
Mar. 1929....	4,229,586	3,863,650	7,858,642	

Balloons Inner Tubes Members only				
	Production	Shipments	Inventories	
Mar. 1930....	3,331,739	3,082,456	7,392,794	
Feb. 1930....	3,030,745	2,786,578	7,171,395	
Mar. 1929....	4,120,493	3,773,585	7,938,587	

High Pressure Cord Casings Members only				
	Production	Shipments	Inventories	
Mar. 1930....	572,417	588,613	2,458,117	
Feb. 1930....	662,419	599,599	2,474,495	
Mar. 1929....	1,397,657	1,157,188	4,330,747	

High Pressure Inner Tubes Members only				
	Production	Shipments	Inventories	
Mar. 1930....	619,416	696,161	3,137,472	
Feb. 1930....	675,126	680,989	3,243,130	
Mar. 1929....	1,475,822	1,276,490	5,356,289	

Custom Business Analyzed

DETROIT, May 13—The retail value of Fleetwood custom-built 8-cylinder Cadillac cars will exceed \$11,440,000 for the present fiscal year, according to officials of the Cadillac Motor Car Co. For the year ending in August next, sales of cars with Fleetwood bodies (Cadillac V-16 and V-8 and LaSalle V-8) will comprise approximately 10 per cent of the company's total business volume. The average price of a Cadillac Fleetwood car is nearly \$5,000.

Ford Has Longer Truck

DETROIT, May 15—To meet the demand for Ford trucks with longer chassis, the Ford Motor Co. today announced the introduction of a 1½-ton truck with 157-in. wheelbase. This is 25½ in. longer than the present wheelbase. The new truck is mechanically the same as the present one, the only changes being a lengthening of the frame and coupling shaft.

Mullins Buys Plant

SALEM, OHIO, May 13—C. C. Gibson, president of the Mullins Mfg. Co., has announced that the company has acquired the local plant of the American Steel & Wire Co. and will immediately occupy this plant in the manufacture of steel boats and other new products, some for the automotive industry, which the company is getting ready to place on the market.

G. M. Offers Truck Survey

DETROIT, May 12—The General Motors Truck Co., Pontiac, Mich., has made available, without charge, to all business men interested in truck operation a booklet known as its "National Motor Truck Analysis" which it has compiled from data supplied by some 5584 firms operating some 46,017 trucks of varied makes. The information includes facts on figures on truck operating, maintenance and depreciation costs, use of special hauling equipment, methods of compensating drivers and other matters pertaining to truck operation.

Noblitt Orders Increase

INDIANAPOLIS, May 14—Noblitt Sparks Industries, Inc., today reported unfilled orders on their books as of May 1, of \$1,912,372 compared with unfilled orders as of May 1, 1929, of \$846,451 and May 1, 1928, of \$194,796. For the first four months of 1930 the company has sold 96,000 of the new heaters it developed during 1929, as against total sales of only 78,000 for the entire year of 1929.

Diesel Plane Operating

DETROIT, May 13—The Thompson Aeronautical Corp. has announced that it will put into operation soon the first Diesel-powered mail plane to be flown in the world, on its Detroit-Chicago route. The plane, manufactured by the Stinson Aircraft Corp., will be equipped with a Diesel engine, and probably will make the initial trip within two weeks.

Garfield Books Nash Order

SALEM, OHIO, May 13—Receipt of an order for the manufacture of products estimated at \$100,000 for the Nash Motors Company, Kenosha, Wis., has been announced by the Garfield Tool & Dyes Co., Inc. of Garfield, near here.

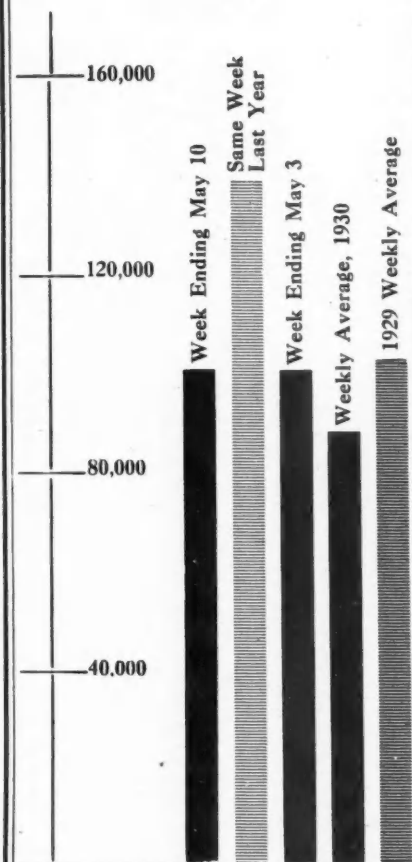
Plans Tool Exhibit

COLUMBUS, OHIO, May 15—The 28th Spring Convention of the National Machine Tool Builders' Association will open here on May 19, according to E. F. DuBrul, general manager.

Bellanca Elects Two

Directors of Bellanca Aircraft Corp. have elected R. B. C. Norduyn and W. B. Hurlburt vice-presidents. The company has opened a metropolitan office in new Chrysler building where Mr. Hurlburt will be in charge of sales. Vice-president Norduyn, up to the present, has been acting as assistant to president of Bellanca Aircraft.

Automotive Industries Production Chart Weekly



The composite chart appearing above will delineate each week production of passenger cars in the United States and Canada, for the week preceding publication of the issue in which it appears, together with production for the preceding week, and other factors. Data used in compiling is are obtained in confidence from a number of sources. Other factors may be added, dependent upon the cooperation of additional sources of information.

French Engineers Expected

NEW YORK, May 15—Twenty-seven French automobile engineers, members of the Societe d'Ingenieurs d'Automobiles, will arrive in New York Monday, May 19, to be the guests of the Society of Automotive Engineers and the National Automobile Chamber of Commerce during their three weeks' visit to the United States. The itinerary planned for the visitors includes a luncheon under the auspices of the N.S.C.C. and the S.A.E., at the Engineers' Club on Tuesday, May 20. On Wednesday the engineers will leave for Buffalo to visit the Pierce-Arrow plant and will go from there to Detroit to inspect the Ford operations and other plants. Several other cities and plants will be visited before the group returns to France on the steamship Rochambeau, sailing Saturday, June 7.

Evans Auto Loading Co. reports net earnings for the first quarter of 1930, after all charges, including Federal taxes, of \$90,086, equivalent to 37 cents per share on the 244,494 shares outstanding.

Automotive Brevities

Modern Diamond Tool Co. has announced removal of its factory and office to 1050 Mt. Elliott Ave., Detroit.

Stutz New York Company has arranged with station WMCA, New York, and WELK, Philadelphia, for a series of Sunday evening programs, according to an announcement from the Stutz factory.

Cutler-Hammer, Inc., Milwaukee, has purchased the outfit of Union Electric Mfg. Co., also of Milwaukee. Branch sales offices and warehouse stocks of Union will be consolidated immediately with Cutler-Hammer units. E. F. Lenoir, president of Union Electric, will become a member of the headquarters sales staff of Cutler-Hammer.

C. R. Mallory & Co., Inc., announces the appointment of Arnold O. Braun as vice-president in charge of sales.

Multibestos Co., Walpole, Mass., has appointed Badger & Dowing, Inc., Boston, to direct its advertising.

Link-Belt Co., Chicago, has announced that effective at once its Baltimore office will be located at 913 Lexington Bldg., with H. D. Alexander in charge.

Auburn Automobile Co., Auburn, Ind., has announced that the Cord front drive car which recently won the Grand Prix at Monte Carlo and Beaulieu will be displayed in a number of the larger cities of this country.

The **Second Annual Michigan Air Tour** will be held July 10 to 19, 1930, according to an announcement from the Board of Commerce at Pontiac, Mich.

C. S. Pease Co., Chicago, has announced that C. B. McCormick, former assistant advertising manager, has been appointed advertising manager to succeed W. Earl Pashley, now second vice-president and assistant sales manager.

Grace & Holliday, Detroit and New York, and John L. Weringo and Staff, Inc., Grand Rapids, Mich., have announced affiliation of the two agencies. Each handles a number of automotive accounts.

Inland Steel Co., Chicago, has recently issued a booklet and two folders on its sheet steel products. They contain information on weight, extra differentials and tolerances and trade customs and practices.

Porter-Cable Machine Co., Syracuse, has announced the appointment of the Briggs Machinery Co., 124 Second Ave., Pittsburgh, and Homer Strong & Co. of Rochester and Buffalo, as agents.

Brown Instrument Co., Philadelphia, has announced the consolidation of its Chicago sales office and mid-western factory branch in new quarters at 155 E. Superior Street, Chicago.

Palmer-Bee Co., Detroit, has announced the opening of a district sales office in New York in charge of H. W. Ruth and located at 30 Church Street. The company has just published a new conveyor catalog.

Sample & Wilson Pty., Ltd., Melbourne, Australia, have announced the addition of George Sample, Jr., to the sales force of the organization. The company represents electrical equipment and accessories manufacturers.

Charles A. Carpenter has opened an office in the Parks Bldg., Pittsburgh, to represent the Buffalo Foundry & Machine Co., The Erie Foundry Co., Kent-Owens Machine Co., Porter-Cable Co., Cincinnati Lathe and Tool Co., and the Wickes Boiler Co., are also numbered among his accounts.

Ford to Remodel Glass Plant

DETROIT, May 13—Plans and specifications for the remodeling of the glass plant of the Ford Motor Co., at River Rouge, are being prepared by Giffes and Vallet, engineers, to provide for the installation of a larger and more modern furnace. Two new substations also are being planned by the same firm, to be located on the top of the "motors building" of the Ford Motor Co., on Miller Rd., Dearborn.

Briggs Manufacturing Elects

DETROIT, May 13—Directors of the Briggs Mfg. Co. were reelected at the annual meeting here yesterday. Robert Pierce was elected secretary and L. A. Clark assistant secretary. All other officers were reelected.

Soviet Completes Unit

NEW YORK, May 14—The Soviet Government has practically completed the forge shop for its tractor plant at the Putilov works. This plant, when completed, is to have a capacity of 20,000 tractors a year.

Hercules Earnings Gain

CANTON, OHIO, May 13—Net earnings of the Hercules Motor Corporation for the first quarter of the year total \$288,528.01 according to announcement of corporation officials today. The figure is exclusive of the amount deducted for Federal taxes.

The amount thus earned is in excess of the figure for the first quarter of last year, which was \$283,459.44. The company now employs more than 1000 men, a larger payroll than anytime previously in its history. The average payroll for 1930 so far has been \$140,000 per month.

The company is now operating two shifts on a 22-hour day basis. Indications, officials state at the present time, are very encouraging for the second quarter. The company makes heavy duty engines for trucks and has an extensive export trade.

British Sales Improve

LONDON, May 1—The Ministry of Transport returns of new car registrations in February just issued indicate that, after lower figures than twelve months earlier in both December and January, the sales of new cars in February recovered, showing an increase as compared with February, 1929, viz., 11,331 against 10,656. Truck sales increased from 3126 to 3833, and buses from 476 to 676. The increase of passenger car sales in February was not large enough, however, to offset the decrease in December and January, the totals for the three months being: 1928-1929, 37,183; 1929-1930, 36,185.

Tyson Begins Operations

MASSILLON, OHIO, May 13—A staff of 30 men working in the engineering and development departments in the plant here of the newly formed Tyson Roller Bearing Corp. marks the start of operations of the company. Work on the new buildings of the company is expected to get under way within the next 60 days.

Nash Production Gains

KENOSHA, WIS., May 12—April production of Nash Motors Company was 7600 cars as compared with 7022 cars in March and 16,066 cars in April, 1929. Nash carried over unfilled orders for 1100 cars into May as compared with 600 orders carried over into April.

Ford Adds Soviet Contract

NEW YORK, May 14—The Ford Motor Co. has entered into a contract with the Sovtorgflot (the Soviet Merchant Marine) to transport the products of its Stamboul plant to the ports of southern Persia, according to the Amtorg Trading Corp.

April Rubber Consumption in Advance of March

Use of Reclaimed Rubber Also Record Increase

NEW YORK, May 15—Consumption of crude rubber of all classes by manufacturers in the United States in the month of April is estimated at 40,207 long tons, according to statistics compiled by the Rubber Manufacturers Association. This compares with estimated consumption of 35,914 long tons in March and 47,521 long tons in April, 1929.

Imports of crude rubber of all classes into the United States during the month of April totaled 49,927 long tons, according to estimates issued by the Rubber Manufacturers Association. This compares with imports of 45,430 long tons in March and with 54,171 long tons in April, 1929.

Consumption of reclaimed rubber is estimated at 17,321 long tons for April as compared with 15,616 long tons in March and 21,574 long tons in April, 1929.

The Association estimates total domestic stocks of crude rubber on hand and in transit overland on April 30 at 148,272 long tons compared with 141,843 long tons as of March 31 and 107,658 long tons as of April 30, 1929. Crude rubber afloat for United States ports on April 30 is estimated at 63,261 long tons as against 63,646 long tons on March 31 and 65,790 long tons a year ago.

Buffalo Section Elects

BUFFALO, May 14—At the May meeting of the Buffalo Section, Society of Automotive Engineers, the following officers were elected to serve for the ensuing year: William Edgar John, Buffalo Gasolene Motor Co., chairman; J. R. Holmes, Harrison Radiator Corp., vice-chairman; E. H. Oehler, Stewart Motor Truck Co., vice-chairman; W. R. Gordon, Fedders Mfg. Co., vice-chairman; A. F. Carlson, Pierce-Arrow Motor Car Co., treasurer, and Marsden Ware, Curtiss Aeroplane and Motor Co., secretary.

New Era Plant to Move

PHILADELPHIA, May 15—The manufacturing plant of New Era Motors, Inc., makers of the Ruxton front-drive automobile, are being transferred from this city to St. Louis.

Mercedes Exhibiting Diesel

NEW YORK, May 15—Mercedes Benz Co. is exhibiting its Diesel engine for trucks and buses at its New York showroom, Park Avenue and Forty-seventh Street.

Firestone Offers New Tire

AKRON, OHIO, May 13—The Firestone Tire and Rubber Co.'s new line of passenger car balloon tires made its appearance on the tire market today.

Men of the Industry and What They Are Doing

Holt Leaves Rubber Division

E. G. Holt has resigned as chief of the Rubber Division, Department of Commerce, Washington, to become manager of the foreign and crude rubber research division of the Goodyear Tire & Rubber Co., Akron, Ohio. Mr. Holt was associated with the Rubber division of the Department of Commerce for eight years. P. W. Barker, now assistant chief of the division, will act as head of the division pending the appointment of a successor to Mr. Holt.

Firestone Advances Brink

W. S. Brink, who has been serving as development engineer for rims and allied equipment at the Firestone Steel Products Co. for several years, has been appointed engineer in charge of all development at Firestone Steel Products. Mr. Brink came with the Firestone company 15 years ago after completing the Purdue University engineering course.

Hyatt Names Booth

Hyatt Roller Bearing Co., Newark, N. J., announces the appointment of F. E. Booth as manager of its motor division in Detroit. Mr. Booth has been associated with the automotive applications of Hyatt Quiet Roller Bearings since 1919. Prior to his new assignment he was assistant manager in Detroit.

Kryder is Advanced

George M. Kryder, in charge of bus sales of the Firestone Tire & Rubber Co. for five years, has been made manager of the Firestone truck and bus sales division. Mr. Kryder joined the Firestone company in 1914, following a chemical engineering course at Case School of Applied Science.

Ford Presents Statue

A bronze statue of Maltreya, the Buddha of the Future, dated 519 and bearing the Buddhist inscription, was presented to the Detroit Institute of Arts by Edsel Ford, who a month ago became president of the Arts Commission. It is valued at \$25,000.

Rothschild Visits Stutz

Baron Henri de Rothschild of Paris, France, while on his way to the West Coast to study American methods of motion-picture making, stopped off in Indianapolis to visit the Stutz factory, where two of his cars are being serviced for Le Mans 24-hour race in France.

G.M. Truck Names Herbig

Edwin T. Herbig, who has lately been handling special sales and sales promotion assignments at the General Motors Truck Co., Pontiac, has been appointed manager of the Boston branch of the company, according to a recent announcement. Mr. Herbig was previously

generally sales manager for the Service Motor Co. for five years. The former manager, Vaughn Smith, on account of ill health, has accepted a leave of absence pending another assignment. Pat E. O'Connor, who has been acting manager of the branch during Mr. Smith's illness, will resume his activities as Eastern regional sales manager.

Studebaker Names Galer

According to an announcement by D. R. Grossman, vice-president and general manager of the Studebaker Corp. of Canada, Ltd., C. N. Galer, a native of Vancouver, B. C., has been appointed sales manager for Studebaker in Canada. Mr. Galer has been associated with Studebaker for a number of years, first as a traveling representative, then as Calgary, Alta., branch manager, later being appointed assistant sales manager for Studebaker. In 1927 he went to London, England, where he became sales manager for Studebaker (England), Ltd. A short while later he was promoted to the position of managing director of the English company. He returns to Canada to assume his new position.

Marmon Advances Tenney

The advancement of George C. Tenney from the position of sales manager to that of assistant to the president of the Marmon Motor Car Co. has been announced by G. M. Williams, Marmon president. Mr. Tenney came to the Marmon company last August as district manager for the New England territory after having been general sales manager of the Locomobile Company of America. Shortly afterward he was made field supervisor and at the time of the New York Automobile Show was appointed sales manager, succeeding John Tainsh, who was promoted to assistant to Thomas E. Jarard, general sales director.

Purchasing Agents to Meet

CHICAGO, May 15—The Aviation Sub-Division, Transportation Group of the National Association of Purchasing Agents, will hold a special meeting during the week of June 16 in connection with the National Association of Purchasing Agents' Convention and Inform-a-show will be held at the Stevens Hotel, June 16, 17 and 18, and Tuesday, June 17, will be Aviation day. E. Van Vechten, purchasing agent, National Air Transport, Inc., Municipal Airport, Chicago, Ill., is chairman of the Aviation Sub-Division.

National Elects Mr. Masters

G. LaRue Masters, sales manager of the National Lock Washer Co., has been elected vice-president in charge of sales of the company.

Kinner Executives Shift

The Kinner Airplane & Motor Corp. announces that W. B. Kinner, heretofore its president, has resigned, and has been succeeded by Robert Porter, the general manager and chairman of the board of directors for the past year. R. E. Olin, the former secretary-treasurer, has resigned, and W. Wardman, who has held the position as purchasing agent, has succeeded Mr. Olin as secretary-treasurer. No change has occurred in the membership of the board of directors.

Mercedes Appoints Straus

J. A. Straus has been appointed general manager of the Mercedes Benz Co., New York, succeeding W. R. Vogeler, who recently resigned. Mr. Straus has been in charge of sales for the company for the past 6 years.

Willys Leaves for Poland

NEW YORK, May 13—John N. Willys, chairman of the board of the Willys-Overland Co., and recently appointed American ambassador to Poland, sailed tonight on the North German Lloyd liner Europa to take up his duties abroad.

Hercules Names Smith

Lon R. Smith has been named assistant director of sales for the Hercules Motor Corp., Canton, Ohio, builders of four and six-cylinder heavy duty engines. His new duties will include supervision of export sales and sales promotion among Hercules distributors.

Auto-Lite Names Bailey

William J. Bailey has been appointed director of traffic for Electric Auto-Lite Co., and its associated and affiliated companies. Mr. Bailey has for many years been associated with the General Motors and Durant organizations.

Schaeffer Joins Brandt

William E. Schaeffer, former general manager of the Motors Metal Mfg. Co., Detroit, has left the company to become associated with A. J. Brandt & Co., industrial and management engineers, Detroit.

Moon Appoints Van Tuyl

Russell Van Tuyl has been appointed director of publicity for the Moon-Ruxton Co., St. Louis, according to an announcement by Helm Walker, vice-president in charge of sales.

Douglass on West Coast

M. D. Douglass, service manager of the Chevrolet Motor Co., left May 9 for a three weeks' business tour of the West Coast.

Canadian March Exports Show 17 Per Cent Gain

Valued at \$2,044,413 Against
\$1,734,840 in February

WASHINGTON, May 14—In March, 1930, the value of Canadian motor vehicle exports totaled \$2,044,413, an increase of 17 per cent over the valuation in February, 1930, when exports reached \$1,734,840, according to the Automotive Division, Department of Commerce.

March production numbered 20,730 units, almost double the cars manufactured in January and 33 per cent greater than the output in February, 1930. March output showed gains in all types of cars as compared with February figures: open passenger cars advanced to 2420 from 2243; closed models rose to 13,850 from 10,033; truck output reached 1011 from 439, and the number of chassis increased to 3749 from 2733.

Output during the first quarter of 1930 was considerably lower than the 93,518 units manufactured in the corresponding three months of 1929, the year in which the Canadian industry established a new high record. However, the rate of production in March was 669 motor vehicles a day, while in February it was only 555 cars, thus evidencing the usual seasonal increase which is expected to become more accentuated during the next few months.

Summer Gasoline Offered

LONDON, May 4—As from May 1 British motorists are to be offered what is described as a new blend of gasoline termed "Summer Shell," which is said to have a smaller proportion of the volatile elements needed to insure easy starting from cold in the winter months. It is offered at the same price as the standard Shell, but it is claimed that, under summer motoring conditions, the larger proportion of heavier elements afford increased power and better acceleration without loss of the anti-knock characteristic of standard Shell.

Suit Against Ford Dismissed

SEATTLE, May 12—After being in the Federal Courts for 12 years, the suit of Alexander Pearson of the Pearson Contracting Company against the Ford Motor Company for approximately \$400,000, has been ordered dismissed by Circuit Court of Appeals for the Ninth Circuit. This reverses the decision of Federal Judge Edward E. Cushman of this district. In 1918 the suit was instituted by Pearson against the Ford Motor Company under a contract Pearson had for the construction of the Ford plant at Des Moines, Iowa.

Oakland Plans Traffic Survey

DETROIT, May 13—A survey of automobile traffic in the major cities of the United States for the purpose of assisting in the promotion of a uniform traffic code wherever possible is being conducted by the Hupp Motor Car Corp.

Guggenheim Medal Awarded to Prandtl

NEW YORK, May 12—The second Daniel Guggenheim gold medal for notable achievement in aeronautics has just been awarded to Dr. Ludwig Prandtl, professor at the University of Goettingen, Germany, "for pioneer and creative work in the theory of aerodynamics." Dr. Prandtl is one of the world's most eminent authorities on aerodynamics and other sciences underlying the art of aviation. He is also well known as an investigator and teacher of the laws of mechanics, thermodynamics and the flow of fluids, particularly air and other gases.

Thompson Plans Production

MUSCATINE, IOWA, May 12—The Thompson Motor Corp., organized to manufacture the Littlemac, a small automobile and truck, will go into production by the end of this month, according to Sam Block, vice-president and general manager, with a daily production of 10 cars. The first machines will be panel-bodied light delivery trucks with capacity of 1000 lb. The company plans erection of its own factory later upon a 30-acre tract which it has acquired near the city.

The corporation is the only automobile manufacturing concern in Iowa at this time. Herbert G. Thompson, president, has announced that application for sale franchise of 100,000 cars over a three-year period has been submitted and is being considered by the company.

Multibestos Joins Almy

WALPOLE, MASS., May 13—Multibestos Co., Walpole, Mass., manufacturers of Multibestos brake linings and clutch facings, has become associated with the Dewey & Almy Chemical Company, Boston. Charles Almy, Jr., has become president of the Multibestos Co.

The Dewey & Almy Chemical Company now has factories in Boston, and branch factories in Farnham, Quebec; Oakland, California; and Naples, Italy. Darex A. G., which is located in Frankfurt, Germany, is a subsidiary of this company. A branch factory or subsidiary company will this year be established in England.

Greece Taxes Old Tires

WASHINGTON, May 15—Aid to the domestic leather industry is understood to be the purpose of Greece which, effective May 2, increased the import duty on used tires and used inner tubes from 40 per cent to 120 metallic drachmas per 100 kilos, according to a cablegram received by the Department of Commerce from Commercial Attache Frederick B. Lyon, Athens. The higher duty is intended to prevent the use of imported old tires and old inner tubes in the manufacture of shoes in competition with the leather industry.

Spain Withdraws Its Aid From National Car Plant

New Government Refuses
Promised Subsidy

PARIS, May 8—The attempt to establish a national automobile industry in Spain has been abandoned as the result of the withdrawal of all Government assistance. The Fabrica Nacional factory at Barcelona is about to cease production, and probably the works will be made use of on a small scale for the experiments in which Mr. Pescara is interested.

After the fall of the Primo de Rivera dictatorship the new Government decided against many of the national planks in this program. It dissolved the Motor Commission and refused to sanction the subsidies which had been promised Mr. Pescara for the National factory at Barcelona. In addition to direct subsidies, this organization had the right to import parts free of duty, and cars sold in Spain were exonerated from taxation for a period of eight years.

The factory was tooled up for the production of the straight-eight model, and was preparing for production of the straight-ten model. An attempt is being made to put these cars into production in France.

Express Road Bill Passed

WASHINGTON, May 15—The Senate on Wednesday of last week passed without discussion the joint resolution looking to the establishment of a national system of express motor highways throughout the country. A similar measure has been introduced in the House, but has not been acted upon by that body. Indications are, however, that it may be passed by the House during the present session. In such an event provisions of the measure will be put into effect immediately. It was introduced in the Senate by Senator Phipps of Colorado, chairman of the Committee on Post Offices and Post Roads, which was unanimously in favor of the bill.

Ford Plant Stepped Up

INDIANAPOLIS, IND., May 12—Announcement has been made that sales in the territory of the Indianapolis branch factory of the Ford Motor Co. had advanced to where it will be necessary to raise the production rate at the branch. For the first time since 1923 the plant has been working night shifts. Additions to the plant buildings are being considered at present, according to the manager.

Budd Books Orders

NEW YORK, May 12—Budd Wheel Co. of Philadelphia and Detroit has just received wheel contracts from two new customers who are among the largest producers of commercial cars. According to H. A. Coward, secretary, this new business should amount to \$4,500,000 in annual sales.

American Austin Sells Bonds to Finance Output

Production to Begin at High Rate About May 15

PITTSBURGH, May 12—American Austin Car Co., Inc., has sold an issue of \$1,000,000 three-year 7 per cent convertible sinking fund gold notes with common stock bonus non-detachable warrants to a group of bankers headed by H. S. Edwards & Co. of Pittsburgh and Bulkely, Vallance & Co. of New York. The bankers will sell the notes at 100 and accrued interest.

The financing is to provide working capital for production of cars on order. As of March 31, 1930, the company had purchase commitments against future delivery of \$1,475,754. Giving effect to proposed issuance of notes the company has ample resources to meet these commitments and leave a substantial balance over current liabilities.

The company has produced some of its bantam automobiles at the Butler plant, but the production line will be started in earnest about the fifteenth of the current month. The May schedule calls for 1000 cars. Contracts have now been approved by the company for a total in excess of 150,000 cars.

Whittelsey Buys Taft

BRIDGEPORT, CONN., May 12—The Whittelsey Mfg. Co., Inc., has purchased the capital stock and assets of the Taft Airplane Corp., which designed and developed the flying boat, Kingfisher, with Phillip E. Taft as chief engineer, constructor and test pilot. The Whittelsey Mfg. Co., Inc., will manufacture the flying boat, Kingfisher, under the name "Whittelsey Amphib." It will be manufactured with and without amphibian gear, as a three-place plane.

De Havilland Reduces Prices

LONDON, May 5—The prices of the standard models of the Gipsy Moth two-seater airplanes and seaplanes have been reduced by £80 by the De Havilland Aircraft Co. New prices are £585 for the airplane and £880 for the seaplane. Reductions of from £25 to £35 have also been made in the prices of the special models.

Wheels Buys Mattern

NEW YORK, May 12—Purchase of the inventories of Jacob Mattern & Sons, Inc., New York, and Mattern Wheel & Rim, Newark, N. J., has been announced by Wheels, Inc., New York. Thomas J. Wetzel, formerly president of Wheels, has been made chairman of the board of the recapitalized company.

Schlee-Brock Purchases Site

DETROIT, May 15—Schlee-Brock Aircraft Corp. has purchased from Calvin A. Palmer for a consideration of \$264,000 a 200-acre site formerly known as the John R airport at John R and 16 Mile Road, according to an announcement by Robert H. Anderson Co., Detroit.

"Facts and Figures" Published

NEW YORK, May 12—Motor vehicle taxes totaled \$930,000,000 in 1929 according to "Facts and Figures of the Automobile Industry" 1930 edition which was published by the National Automobile Chamber of Commerce last week. There are now 5,677,500 motor vehicles on farms according to this annual review of motor transportation which has appeared each spring since 1919.

Hayes Reports Loss

DETROIT, May 12—Hayes Body Corp. has reported net loss of \$106,695 for quarter ended March 31, after depreciation, interest, etc. No report was published for the first quarter of 1929. However, for six months ended June 30, 1929, company showed net profit of \$64,011, after depreciation, interest, etc., but before Federal taxes, and for the full year 1929 a net loss of \$245,045, after all charges. Capitalization consists of 317,248 shares of no par common stock.

Plans Steel Exhibit

CHICAGO, May 13—Steel will have an honored position here for seven days this fall when, from Sept. 16 to Sept. 23, the twelfth annual steel exhibition will occupy 80,000 sq. ft. of floor space at the Stevens Hotel. Metals of all sorts will have a special display. The exhibition is being arranged under the direction of the American Society for Steel Treating, with headquarters in Cleveland, Ohio.

American Eagle Seeks Merger

KANSAS CITY, May 13—American Eagle Aircraft Co. is negotiating for acquisition of Szekely Aircraft Co., Holland, Mich.; Light Machine & Foundry Co., Pottstown, Pa.; Lincoln Aircraft Co., Lincoln, Neb., and Alliance Aircraft Co., Alliance, Ohio. First noted company plans consolidation of acquired interests and will carry out expansion, including production of motors for power gliders as now produced by Lincoln Company, other aircraft motors and completed aircraft.

Opposes Purchase Bill

WASHINGTON, May 15—Comptroller General J. R. McCarl has announced his opposition to the House bill which would authorize the Postmaster General to use his discretion as to the most advantageous bid with regard to standardization of purchases of motor truck equipment.

FWD Sales Increase

CLINTONVILLE, Wis., May 12—Sales of the Four Wheel Drive Auto Co., Clintonville, Wis., during the first quarter of this year, showed an increase of 33.9 per cent, it is announced.

Hudson Adds Essex Brougham

DETROIT, May 14—Hudson Motor Car Co. has announced the addition of a brougham to the Essex Challenger line.

Indian Motorcycle Plant Sold to duPont Motors

E. Paul duPont Heads Both Companies

WILMINGTON, DEL., May 12—E. Paul duPont of Wilmington, president of duPont Motors, Inc., which manufactures automobiles here, and who has recently been elected president of the Indian Motorcycle Co., Inc., of Springfield, Mass., has made a statement to the effect that the Indian motorcycle plant will remain in Springfield, but no decision has been reached regarding the ultimate disposition of the duPont Motors plant here. There have been rumors that it would be moved to Springfield, to be operated directly in conjunction with the Indian motorcycle plant, but Mr. duPont said no decision had been reached. He stated that he will remain as president of the two corporations and will actively superintend their management.

The Indian Motorcycle Co., of which Norman T. Bolles was president, was acquired by Mr. duPont and associates recently. It was acquired by Mr. Bolles and associates in 1929. Indian motorcycles and outboard motors are made at the plant.

Dunlop Profits Increase

LONDON, May 5—In a preliminary announcement today the directors of the Dunlop Rubber Co. state that, subject to final audit and after providing for depreciation, the profit for 1929 amounted to £2,307,354, an increase of nearly 70 per cent compared with 1928, for which year the profits were £1,359,893. After the dividends on preference shares paid by subsidiary companies have been deducted, there remains £1,997,604. Interest on debenture stock, etc., absorbs £421,019, leaving a balance on profit and loss account of £1,576,585.

Auto Lite Buys Door Check

TOLEDO, May 13—Electric Auto Lite Co. has purchased plant and business of Concealed Door Check Co., Kokomo, manufacturer of automobile locks and locking devices. Company will be continued at present location and will be operated under direction of Prest-O-Lite Storage Battery Corporation, Speedway, Indianapolis, a subsidiary of purchasing company.

Fairchild Gets Army Order

NEW YORK, May 12—The signing of a contract for immediate production of eight Fairchild 71 monoplanes for the U. S. Army Air Corps, Material Division, was announced today by Fairchild Aviation Corp., manufacturing subsidiary of the Aviation Corp.

Ruxton is in Production

ST. LOUIS, May 13—The Ruxton front-drive car is now in production at the St. Louis plant of the Moon-Ruxton Co., according to an announcement. It is expected that the car will be marketed on a national basis within the next four weeks according to the announcement.

Automotive Construction Continues Steady March

Machine Tool Sales Also in Healthy Condition

PHILADELPHIA, May 15—Machine tool and factory equipment sales show considerable strength in the major manufacturing centers, although announcements of new construction projects in the automotive field declined during the past week, as compared with the previous week. Among the announcements of contemplated construction and building under way last week were:

Allis-Chalmers Mfg. Co., Milwaukee, has begun excavation for a new Shop No. 7 of the main works at West Allis, to be 145 x 304 ft., 50 to 60 ft. high. The investment will be upward of \$300,000, including equipment.

Alfred H. Eccles, Long Island City, architect and engineer, awarded contract to William Flaherty, Elmhurst, L. I., for automobile service, repair and garage building, to cost about \$115,000 with equipment.

Hillas Motor Car Co., Newark, leased two-story and basement building, to be erected at Central Ave. and South Twelfth St., for a service, repair and sales building to cost about \$125,000 with equipment. General contract let to Fred Kilgus, Inc. Henry D. Scudder, Jr., architect and engineer.

Ford Motor Co., Dearborn, Mich., considering purchase of waterfront site at Buffalo for new plant for salvaging discarded automobiles, including metal-reclaiming works with electric furnaces and auxiliary equipment, reclaimed material to be shipped by water route to Dearborn plant and utilized there as raw material.

York Hoover Body Corp., York, Pa. (automobile bodies), awarded general contract to Hess Brothers, for addition to cost \$40,000 with equipment.

Automobile Rotary Lift Co., Memphis, Tenn. (automobile jacks, etc.), has arranged for an increase in capital from \$200,000 to \$500,000, part of fund to be used for expansion.

City Council, Russellville, Ark., is planning municipal airport with hangar, repair and reconditioning shop, etc., to cost about \$50,000.

National Automobile Hotel Co., Oklahoma City, Okla., has acquired property as site for seven-story automobile service, repair and garage building, to cost over \$300,000 with equipment. D. I. Johnston is head.

Gordon Body Co., Indianapolis (automobile bodies), asked bids on general contract for one-story plant, to cost about \$30,000 with equipment.

Municipal Flying Field, Shreveport, La., has had plans approved for new buildings at municipal airport, including hangars, reconditioning and repair facilities, to cost about \$100,000.

Ludlum Issues Catalog

PHILADELPHIA, May 12—Ludlum steels of various types, including tool steels, are described in a new loose-leaf catalog just published by the Ludlum Steel Co., Watervliet, N. Y. This catalog gives in detail the analysis, heat-treatment and applications of the various grades. A reference book containing a wealth of statistical information and tables of weights and heat-treating specifications forms a valuable adjunct to this catalog.

Willys Stocks Decrease

TOLEDO, May 12—New car stocks in the hands of Willys-Overland dealers on April 26 totaled 15,689 units as compared with 35,283 cars in stock on the same date last year, it was announced at the Willys-Overland factory here today. This is a reduction of 19,594 cars.

Sears Enters Evanston

CHICAGO, May 12—Sears, Roebuck & Co. plans to open its first store in Evanston, Ill., within a few days at 1029-31 Davis street. It will be one of 31 new retail stores being opened throughout the country by the mail-order house. The Evanston store will specialize in auto supplies, radio and electrical equipment.

Reports Increased Profit

CINCINNATI, May 14—The report of Aluminum Industries, Inc., for the first quarter of this year, submitted to the Stock Exchange, reveals dividend earnings for the period of 64 cents as compared with 46 cents in the first three months of 1929. Net profits of the company March 31, after Federal taxes and all other charges, were approximately \$63,907 compared with \$46,442 for the same period last year. In submitting the statement President John Eckert announced that both the parent plant and the Diamond division, at St. Cloud, Minn., are operating at capacity with full forces in all departments and with contracts on hand assuring equally gratifying conditions throughout the second quarter.

Protest Bus Bill Shelving

WASHINGTON, May 15—Elimination of the motor bus regulation bill from the Senate program for the remainder of the present session was vigorously protested by a number of Senators on the floor last week. Senator Barkley of Kentucky and Senator Bratton of New Mexico urged that the measure be restored to a place in the program so that it can be disposed of before adjournment. The action of the steering committee of the Senate in striking the motor bus bill off the program in order to give a preferred status to the railroad consolidation measure was also attacked by Senator Hawes of Missouri.

Buys Tire Cover Plant

CHICAGO, May 12—Claire L. Barnes, president of the Houdaille-Hershey Corp., has announced acquisition of the Lyon Cover Co., producers of automobile metal tire covers. The Houdaille company plans immediately to increase production facilities of this division to meet the large demand for these metal tire covers.

Visit Graham-Paige Plants

DETROIT, May 12—Four representatives of the Skoda Works, Prague, Czechoslovakia, one of the largest European manufacturers of machinery, and 86 members of the Senior Civil Engineering class of Purdue University, Purdue, Indiana, were recently conducted through the Graham-Paige plants.

Accept Highway Invitations

WASHINGTON, May 15—Virtually all of the 58 countries invited by the State Department to participate in the sixth International Road Congress to be held here in October are expected to be represented, according to Thomas H. MacDonald, secretary-general of the American Organizing Commission.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, May 14—The abnormally high temperatures last week stimulated sales of spring goods but were detrimental to general retail business. Wholesale and jobbing lines were not very satisfactory, and buying was mostly in small quantities to meet temporary needs. The hot weather and the accompanying rains were very beneficial to the crops.

CHAIN STORE SALES

Sales of 29 store chains in April totaled \$247,329,966, as against \$244,940,114 a year ago. However, sales in April, 1929, did not include the Easter business. Sales of these same store chains during the first four months of the year amounted to \$911,009,348, which marks an increase of 4.3 per cent above those a year ago.

COMMERCIAL FAILURES

Commercial failures during April, according to R. G. Dun & Co., numbered 2198, as against 2347 during the preceding month and 2021 a year ago. Liabilities involved in the April failures amounted to \$49,059,308, as against \$56,846,015 the preceding month and \$35,269,702 a year ago.

CRUDE OIL OUTPUT

Average daily crude oil production for the week ended May 3 amounted to 2,595,200 bbl., as against 2,590,100 bbl. for the preceding week and 2,629,850 bbl. a year ago.

CAR LOADINGS

Railway freight loadings during the week ended April 26 totaled 907,174 cars, which marks a decrease of 144,711 cars below those a year ago and a decrease of 55,833 cars below those two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended May 10 stood at 89.0, as against 89.7 the week before and 90.2 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended May 7 were 1 per cent above those a year ago.

BROKERS' LOANS

Brokers' loans in New York City for the week ended May 7 decreased \$200,000,000, following an expansion of \$785,000,000 in the nine preceding weeks.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended May 7 showed decreases of \$34,400,000 in holdings of bills bought in the open market, of \$1,700,000 in holdings of Government securities, and of \$35,300,000 in member bank reserve deposits. There was an increase of \$4,000,000 in holdings of discounted bills. The reserve ratio on May 7 stood at 83.0, as against 82.5 a week earlier and 81.8 two weeks earlier.

Italy Plans to Expend \$40,000,000 on Aviation

Budget With Appropriation Passes
Both Chambers

WASHINGTON, May 12—Italy will spend approximately \$40,000,000 on aeronautics in the year 1930-31, the aviation budget for this sum having recently been passed by both houses of Parliament, according to a report received in the department of commerce from Commercial Attache Mowatt M. Mitchell at Rome. Of this total approximately 11 per cent will be expended on civil aviation. The entire air budget represents an increase of approximately \$1,000,000 over the previous year, and the civil aviation increase alone is almost as large.

In the four years since the beginning of civil aviation in Italy the length of routes in operation has increased three and a half times, the total distance flown five and a half times, the number of passengers carried five times, the amount of mail and newspapers carried 40 times, and the weight of baggage and freight 11 times. In 1929, as compared to 1928, the length of routes operating increased 73 per cent, total mileage flown 48 per cent, passengers carried 61 per cent, baggage and freight carried 57 per cent, while the quantity of mail and newspapers transported increased more than threefold. The following figure demonstrate this growth:

During 1929 a regularity of flight of 97.97 per cent was maintained, and as far as is known, only one passenger has been lost during the four years of Italian civil aviation operation.

There are 18 civil transport lines in operation, covering practically the whole of Italy and a large part of the Mediterranean basin. Passenger rates on these lines have recently been subject to heavy reductions, thus comparing favorably with railroad and steamship rates.

Climax Sales Gain

CLINTON, IOWA, May 12—April sales of the Climax Engineering Co., of Clinton, Iowa, with main offices in Chicago, were 12 per cent greater than those for March. Included in its list of products sold were engines, heavy-duty reverse clutches and kindred devices.

Feature Issues of Chilton Class Journal Publications

Chilton Automotive Multi-Guide,
First Semi-annual Issue.

Ready in May

Highway Contracts Gain

WASHINGTON, May 15—Highway construction contracts awarded during the first quarter of the current year by 35 states totaled \$114,101,383, as compared with \$50,910,133 for the corresponding period of last year, a net increase slightly in excess of 124 per cent, according to reports received by Secretary of Commerce Lamont from state governors. Thirty states report increases, with 16 announcing contract awards for the first quarter of 1930 of 100 per cent or more above those for the first quarter of 1929. The dollar value in awards was made by Pennsylvania, which increased its outlay in money by 577 per cent to \$15,469,853, as against \$2,282,813.

Graham to Add Body Model

EVANSVILLE, IND., May 13—With present busy production schedule, calling for employment of 1000 people, averaging an output of 225 bodies per day, the Graham-Paige Body Corp. is preparing to add another model to its line about June 1, in the two-passenger coupe, J. W. Evans, factory manager, stated today.

Stinson Establishes Factory Branch

WAYNE, MICH., May 12—Establishment of a third factory branch by the Stinson Aircraft Corp. was made known today with the announcement of the formation of the Stinson-Illinois Company to be located at Chicago.

To Hold Aero Meeting

NEW YORK, May 12—The Aeronautic Division of the American Society of Mechanical Engineers will hold its fourth annual meeting at Dayton, Ohio, and Wright Field May 19 to 22.

Auburn Reports Earnings for First '30 Quarter

Net is Equal to 55 Cents a Share,
Compared With \$3.04 in '29

AUBURN, IND., May 12—Auburn Automobile Co. in the three months ended Feb. 28, 1930, earned a consolidated net profit, after depreciation, taxes and minority interest of \$96,623, equal to 55 cents a share on the 173,385 shares of stock outstanding, compared with \$526,573 or \$3.04 a share, on the basis of the same capitalization, in the corresponding period a year ago.

E. L. Cord, president of the company, in issuing the statement said: "The reduction in earnings for this period was only natural and expected due to general existing conditions. Our business is progressing satisfactorily now."

The company's balance sheet as of Feb. 28, 1930, reveals a strong position, with current assets of \$13,464,073, and current liabilities of \$3,595,966.

Perfect Circle Sales Gain

CHICAGO, May 12—The Perfect Circle Company reports first quarter sales of piston rings for replacement purposes to jobbers and dealers showed an increase of seven per cent over the same period in 1929, and indications are that April sales will exceed those in March. Automobile manufacturers have released more orders for rings during May, than during any previous 1930 month. Two additional manufacturers have adopted the company's piston rings, Dodge for its new eight, and De Soto for the new De Soto eight.

Motor Wheel Declares Dividend

DETROIT, May 12—At a meeting of the Board of Directors of Motor Wheel Corp., Lansing, Mich., held May 6, a cash dividend of 75 cents per share on the common stock was declared payable June 10 to stockholders of record at the close of business May 20, 1930.

Lycoming Shipments Increase

WILLIAMSPORT, PA., May 13—General shipments of Lycoming Manufacturing Company, affiliated with Auburn Automobile Company, showed an increase during April of about 15 per cent over March. W. H. Beal, vice-president, said today.

Calendar of Coming Events

SHOWS

Berlin, International Automobile...Nov. 6-16

CONVENTIONS

National Association of Credit Men, Annual Convention, Dallas...May 12-16
National Aeronautic Meeting (Auspices A.S.M.E.), Dayton, Ohio...May 19-22
National Foreign Trade Conference, Los Angeles...May 21-23
Society of Automotive Engineers, Summer Meeting, French Lick Springs...May 25-29
Automotive Engine Builders' Association, Convention, Chicago...May 26-28
National Conference on Street and Highway Safety, Washington...May 27-29
National Automobile Chamber of Commerce, Annual Meeting, New York...June 5

A. S. M. E., Semi-Annual Meeting, Detroit...June 9-12
A. S. M. E., Oil, Power & Gas Div. State College, Pa.June 12-14
World Power Conference, Berlin...June 16-25
Railway Supply Mfrs. Assn., Meeting and Exhibit, Atlantic City...June 18-25
American Railway Association, San Francisco...June 23-26
American Society for Testing Materials, Annual Meeting, Atlantic City...June 23-27
Steel Founders Soc. (Midsummer Convention) White Sulphur Springs...June 26-28
Eastern States Exposition, Springfield, Mass.Sept. 14-20
National Safety Council, Annual Safety Congress, Pittsburgh....Sept. 29-Oct. 4

Sixth International Road Congress, Washington, D. C.Oct. 6-11
Exhibition—American Roadbuilders Association, Washington, D. C....Oct. 6-11
Motor and Equipment Association, Convention, Cleveland.....Nov. 10-14

SALONS

Chicago, Drake HotelNov. 8-15
New York, Commodore Hotel...Nov. 30-Dec. 6

RACES

IndianapolisMay 30
BelgiumJuly 5-6
Germany (Grand Prix)July 13
Belgium (European Grand Prix).....July 20
SpainJuly 27
Italy (Grand Prix)Sept. 7
France (Grand Prix)Sept. 21